Special coverage begin after page 36

NetworkWork

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June 23, 2003 ■ Volume 20, Number 25

BOuncing back to adband

Some well-publicized bankruptcies froze the broadband services market, but companies now are starting to jump back into the pool. Find out which technologies are ready for deployment today. Page 61

WLAN managers see cavalry coming

■ BY JOHN COX

Faced with deploying up to 1,000 wireless access points

across 160 buildings on two separate campuses, McGill University network chief Gary Bernstein immediately recognized the management challenge:

"With a thousand access points, you can't use sneaker power to manage [them]," says Bernstein,

whose Montreal educational institution is among the trailblazers rolling out large-scale wireless LANs (WLAN).

> Many of these pioneers by necessity have built their own management tools and figured out management techniques by trial and error. However, today they can take

advantage of a growing number of third-party management products. They also are starting to

See WLAN, page 84

Trade shows look to lure buyers, not big turnouts

■ BY TIM GREENE

Smaller is better, or so the promoters of IT trade shows would have you believe.

Once anxious to brag that Comdex was the biggest industry show — it peaked at 200,000 attendees in 2000 — organizers of the sprawling fall tech extravaganza in Las Vegas now whistle a different tune: Relevance is the thing. About 125,000 attended last year and, by choice, the organizers are trimming that back to 80,000 this year.

"Over the last two decades shows were all about size: numbers of people, number of exhibitors, big booths, lots of tchotchkes,lots of noise, all about brand awareness and grabbing mindshare," says Robert Priest-Heck, new CEO of the former Key3Media, which emerged from bankruptcy last week with a new name: Medialive International.

Things have changed, he says, and the people who pay for show floor space don't want lots of people walking by; they want people who buy products. "Who cares about bodies?" Priest-Heck says. "People really want quality decision makers."

As a result, Medialive is making an effort to keep out the bane of trade-show booth staffs: people who walk around gathering Tshirts, pens and other giveaways but don't buy anything. Attendees will either be pre-qualified for Comdex by the nature of their work or pay to attend. And to maintain a corporate focus, the

See Shows, page 85

Move afoot to speed XML traffic

■ BY JOHN FONTANA

The growing use of XML and Web services is fueling development of hardware that promises to accelerate the processing of XML traffic and eventually become a staple of network architectures.

Start-up vendors are poised to introduce products, established vendors are receiving millions of dollars in additional funding, and network stalwarts such as Cisco are keeping a watchful eye on developments.

So-called XML-aware network

hardware or traffic acceleration devices work at or near wire speeds to process bulky XML messages. This is an exercise that users find can eat up nearly 80% of server processing power when done with application server software.

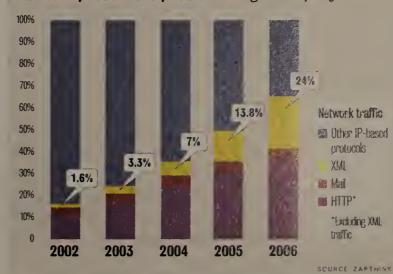
A new generation of enterpriseclass XML protocols for security, process workflow, reliability and management only promises to accentuate the problem.

"XML trades performance for extensibility," says Ted Schadler, principal analyst for software at Forrester Research. "The extensibility

See XML, page 82

Traffic jam

Because of its use in Web services applications, XML's network presence is predicted to grow rapidly.



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Interactive

Wireless Wizards

In our newest Fusion-exclusive column, each week our Wizards will answer your tough questions. This week, they answer the question: "We are in the process of deploying an 802.11-based WLAN. How do we determine optimal radio coverage throughout the campus?" Read the columns, then see if you can stump the Wizards! DocFinder: 6437

VoIP: What's next for the enterprise?

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BOuncing back to

If you're considering rolling out a new broadband service, this report will describe the technologies that are ready for prime time, those you should have on your radar screen and those that are several years away. Page 61.

Red Hat edges out United Linux in our test of Linux distributions. Page 64.

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Oculan's network management tools offers plug-and-play functionality. Page 68.

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Tom Henderson is being driven crazy by drivers. Page 69.

NetworkWorldFusion

Columnists

Compendium

One way to lock down your computer Fusion Executive Editor Adam Gaffin says it's the ultimate in PC security: All you need is a large container, a shovel, a screwdriver, water, concrete mix and some wood. DocFinder: 6440

Telework Beat

How sticky are we? Net.Worker Managing Editor Toni Kistner says cable providers could face a tough time hanging onto their broadband customers. DocFinder: 6441

Small Business Tech

Where to turn for IT services? Columnist James Gaskin looks at how one small company chose its technology partner. DocFinder: 6442

Digital Domicile

Catching customers with home nets Columnist Mike Wolf examines why telcus are ahead of cable companies in providing broadband-managed home networks. DocFinder: 6443

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Microsoft: No more IE for Apple

■ Microsoft will stop developing versions of its Internet Explorer browser software for Macintosh computers, saying that Apple's Safari is all that Apple needs. Microsoft will no longer develop Explorer as independent software, only as part of its Windows operating system. "Browsers are now a generally established piece of the operating system, and it doesn't make sense to keep developing them separately," says Neil Laver, Microsoft U.K. desktop marketing manager. Microsoft's development of Explorer for Apple's computers was driven by a five-year agreement that has lapsed. The decision will cause concern for Mac users who use Explorer to access sites that are not accessible using other browsers. Many site developers develop purely for Explorer, as it is the dominant browser worldwide.

FTC catches Guess with pants down

■ The Federal Trade Commission has settled a case with clothing marketer Guess, stemming from complaints that since at least October 2000, www.guess.com has been vulnerable to commonly known attacks that let personal information including credit card numbers be exposed to hackers. Guess claimed its Web site "has security measures in place to protect the loss, misuse or alteration of information under our control." The FTC said personal information was not stored in unreadable and encrypted format at all times and that Guess failed to protect against commonly known attacks. In February 2002, a visitor to the Web site, using a SQL injection attack, read in clear text the credit card numbers stored in Guess databases, according to the FIC, which was bringing such a case for the third time. The FIC settlement requires Guess to implement a comprehensive security program.

OSDL lands Mr. Linux himself

MAs Linux continues to make inroads into enterprise data centers, the developer of the open source software has joined Open Source Development Labs, a consortium focused on developing the Linux operating system for corporate use. Linus Torvalds, who created Linux in 1991 when he was a university student in Finland, is taking a leave of absence from chip maker Transmeta to move to OSDL where he will focus exclusively on Linux. Torvalds will become the first fellow of OSDL, which is a nonprofit organization formed in 2000 to accelerate the growth and adoption of Linux in corporations. Its members include Cisco, Computer Associates, HP and IBM. Stuart Cohen, who took over as CEO of OSDL in

CHMPDWXIIIA

Drilling down into CDs

Ever wondered what would happen if you spun a CD on a high-speed drill? "On contacting the closed door, the CD did a most unexpected thing: it first bounced back a few inches, and then, when it hit the door again, it jumped straight up the door and struck the ceiling, exploding into thousands of fragments which rained down on the entire room." More (with video) at www.nwfusion.com, DocFinder: 6446.

TheGoodTheBadTheUgly



Can't go without e-mail? Even at 30,000 feet? United Airlines became the first U.S. airline to announce an in-flight e-mail service. How much? A shade less than \$16 per flight, plus 10 cents per kilobyte over 2K bytes.



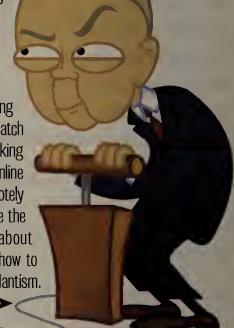
Not too comforting. A Deloitte Touche Tohmatsu survey made public last week shows that 39% of financial institutions suffered one or more

security breaches within the past year, and twothirds of those incidents originated from outside the company. Only 5% of respondents reported being "extremely confident" in their protections against such attacks.



Booby prize for Hatch.

Politicians often say silly things about policing the Internet, but this one from Sen. Orrin Hatch (R-Utah) might set a new standard. Speaking about the music industry's problem with online copyright infringement, Hatch said that remotely damaging an offender's computer "may be the only way you can teach somebody about copyrights." . . . Left unaddressed was how to teach lawmakers about the dangers of vigilantism. (See Mark Gibbs' commentary, Page 86.) ➤<



April, says Torvalds' decision to join OSDL lends credibility to the organization that is aiming to be the center of Linux development in corporations. Last year, OSDL launched the Data Center Linux project to strengthen Linux as an enterprise computing platform.

Voice system saves Amtrak millions

■ The voice that answers the phone at 1-800-USA-RAIL, Amtrak's reservation line — "Julie" — now is trained to process credit card payments for a reservation. What took Julie so long to learn credit card transactions? She is really a machine, eight of them to be precise. SpeechWorks, the system's original developer, reused an existing voice-enabled credit card module tweaked for Amtrak to help process reservation bookings and payment without the need for human intervention. The credit card service began rolling out in April and now is available nationwide. The system accepts 20 million incoming calls annually of which 25% to 33% are handled without the need for a human agent. Amtrak estimates it has saved \$13 million since the service came online in April 2001.

Report applies cold press to hot spot fever

■ IDC threw cold water on the hot spot hype this week, predicting that although worldwide commercial Wi-Fi locations are set to grow 57% annually over the next five years, the market is still young and rife with uncertainty. In a report summary, IDC analysts likened the hot spot market to a "technology gold rush" and warned that despite promises, it is still in the early phases of deployment. Most business models are not yet proven, and the competitive landscape is very unclear. The firm predicted that the Wi-Fi market would evolve in two stages, with an emphasis on network expansion over the next two years, followed by three years of relationship building among carriers. Still, the market could offer some sizzling revenue opportunities. IDC estimates that Wi-Fi revenue streams would grow 143% annually over the next five years, while the number of users is expected to double each year over that same period.

PeopleSoft again rebuffs Oracle bid

■ PeopleSoft's board of directors on Friday again rejected Oracle's bid for the company and recommended that its shareholders shoot down the \$6.3 billion offer, saying the deal is not in the best interest of the company and would likely run afoul of antitrust laws. The rejection came two days after Oracle sweetened its original \$5.1 billion offer for the Pleasanton, Calif., enterprise software provider, which sparked the firestorm between the companies. Oracle's initial bid, on June 6, came just days after PeopleSoft announced it was acquiring J.D. Edwards, putting the merger in jeopardy. PeopleSoft and J.D. Edwards sued Oracle over its aggressive pursuit, and Oracle shot back earlier this week, increasing its offer for PeopleSoft and suing the company for "eliminating" shareholders' ability to accept the offer.



Riley's band took second place in a battle of the bands contest. They won some hair gel and a Neil Diamond album. Keep on rockin', Riley.

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6/23/03 News

Confusion reigns over data archiving

BY DENI CONNOR

NEW YORK — Users, vendors and securities industry officials wrangled last week at the Securities Industry Association Technology Management Conference in New York about ambiguous Securities and Exchange Commission requirements on e-mail archiving and retention.

Storage vendors EMC and Iron Mountain reacted to the recently released SEC 17a-4 Interpretive Ruling by showing off hardware and software that they say complies with the ruling. The original SEC Rule 17a-4 and the new Interpretive Release define how broker-dealers should archive and retain electronic communications, including e-mails and instant messages relating to

"There is a lot of confusion in the securities industry about what has to be retained and for how long," said Mark Lackritz, president of the SIA, in a speech at the show.

After years of clamoring by security organizations to clarify the records management rule, the SEC issued the interpretive release in May This interpretation

clearly dispels the issues around the deployment of storage hardware and software for e-mail retention, the SEC says.

The interpretation says that broker-dealers must preserve records "in a non-rewriteable and non-erasable format."This means that customers can deploy systems that use disk-based storage media and integrated software that prevents the overwriting, erasure or alteration of records. Previous to the interpretation. users understood this to mean that e-mails and instant messages needed to be stored on write-once, read-many storage media - such as, optical platters, CD-ROMs or DVDs.

But neither the SEC nor the nongovernment self-regulatory organizations (SRO), such as the National Association of Securities Dealers, specify which hardware/ software combinations are compliant. That means IT executives are left to determine if their deployment of storage software and hardware are compliant.

"The SRO isn't going to tell the customer what is compliant," says Patrick Gordon, a consultant with Compliant Systems Consulting. "[Customers] are going to have to

Securities firms in e-mail hole

In the last six months the Securities and Exchange Commission, the New York Stock Exchange, the National Association of Securities Dealers and Massachusetts security regulators have passed down fines to several top brokerages for losing or not archiving e-mall.

| Company | Fine | Violation | Date |
|----------------------------|----------------|--|---------------|
| SG Cowen | \$100,000 | E-mails deleted before retention period expired. | May 2003 |
| Deutsche Bank Securities | \$1.65 million | Violated SEC 17a-4, NYSE 440 and NASD 3110. | December 2002 |
| Goldman Sachs | \$1.65 million | Violated SEC 17a-4, NYSE 440 and NASD 3110. | December 2002 |
| Morgan Stanley | \$1.65 million | Violated SEC 17a-4, NYSE 440 and NASD 3110. | December 2002 |
| Salomon Smith Barney | \$1.65 million | Violated SEC 17a-4, NYSE 440 and NASD 3110. | December 2002 |
| U.S. Bancorp Piper Jaffray | \$1.65 million | Violated SEC 17a-4, NYSE 440 and NASD 3110. | December 2002 |

get their compliance people, legal departments and their IT people together and hash out the rules. It's up to the users to do their own research."

The interpretation is also "the death knell" for systems that use passwords, authentication and approval policies to ensure that e-mails aren't deleted or altered, Gordon says.

"Such systems — which may use software applications to protect electronic records, such as authentication and approval policies, passwords or other extrinsic security controls - do not maintain the records in a manner that is non-rewriteable and non-erasable," the interpretive release says.

Analysts also say the ambiguity of the rule and the SEC's refusal to make specific technology recommendations might cause delays in equipment deployment of storage projects.

"The interpretive release provides users with confirmation that they are on the right track," says Peter Gerr, senior analyst with Enterprise Storage Group. "Whether the interpretation will delay technology purchases or not depends on vendors' awareness with the whole process and their assistance to the customer in navigating it."

Users might want to comply with the rule quickly and not put their companies at risk, especially in light of fines recently levied against firms such as SG Cowen Securities, SG Cowen was fined \$100,000 earlier this month by Massachusetts securities regulators for not keeping e-mails.

After several years of inaction and non-compliance with Rule 17a-4, which was adopted in 1939 for paper microfilm and microfiche, the SEC, National Association of Securities Dealers and the New York Stock Exchange fined five other securities firms for a total of \$8.25 million in December 2002 for not complying with the SEC rule.

The SIA recommends that customers planning to implement e-mail retention systems submit a letter to their SRO detailing the hardware and software they want to deploy as much as 90 days before installing it. The SRO, while familiar with the technologies, does not issue a list of the software and hardware combinations that comply.

That's where service provider companies such as Iron Mountain can help, says one brokerage firm executive who didn't want his company named.

"We found the outsourced model to have a lower starting cost and potentially a lower total cost of ownership than doing this in-house," he says.

On the product front, Iron Mountain has added e-mail supervision and support for litigation discovery and regulatory investigations to its Digital Archives Services. Supervision of e-mail and instant messaging is a requirement of the National Association of Securities Dealers Rule 3010 and the New York Stock Exchange Rule 342, which stipulate that broker-dealers establish procedures for monitoring electronic communications and keep records of supervisory reviews.

EMC also announced that its recently introduced Centera Compliance Edition meets the SEC interpretive release and further complies with the Department of Defense electronic certification 5015.2 Records Management standard.

Financial IM to be stored for three years

.S. securities regulators put a further onus on financial firms to keep records of their business this week, this time focusing on the increasingly popular form of communication known as instant messaging.

The National Association of Securities Dealers (NASD) informed its roughly 5,300 brokerage firm members Wednesday that they must retain their instant-messaging records for at least three years. Under federal law, securities firms doing business with the U.S. public must be a member of NASD.

The rule, which follows similar regulations for e-mail, could leave financial firms scrambling to rein in employees' use of the quickfire communication tool. What's more, NASD advised that securities firms must supervise employees' instantmessage use and that consumer instant-messaging products are often not adequate because they don't allow for monitoring.

"Firms have to remember that regardless of the ir formality of instant messaging, it is still subject to the same requirements as e-mail communicatimes and members must ensure that their use of ratant messaging is consistent with their basic servisor, and record keeping obligations," Mir Schallro, NASD vice chairman and president of regulatory policy and oversight, said in a

While financial firms have been early adopters of corporate instant-messaging products that offer archiving capabilities, the new rule still could affect firms that have not put monitoring practices into place or have employees who use consumer instant-messaging products in addition to company-sanctioned instant-messaging tools.

Olivier Beauvillain, an analyst with Jupiter Research, says the new rule could lead companies to put the same sort of restrictions on instant messaging that they put on workplace Web use, even if employees are using it to communicate with friends and family.

But while security firms are under the gun to rope in their employees' messaging habits, the rule could spell good news for the growing number of corporate instant-messaging vendors. Leaders in the consumer instant-messaging market, such as Microsoft, Yahoo and AOL, have all rolled out corporate versions of their products in recent months and could stand to benefit from the new regulations.

- Scarlet Pruitt is a correspondent with the IDG News Service's London bureau.

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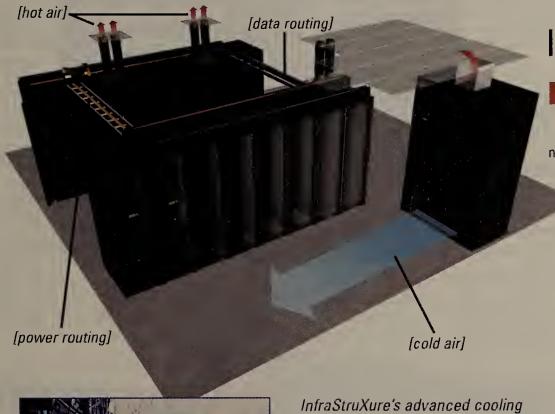
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> > Vince Pombo Vice President of Engineering **Rich Flanders Director of Engineering Time Warner Cable**

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MGI launches new IP offers at CeBit

BY DENISE PAPPALARDO

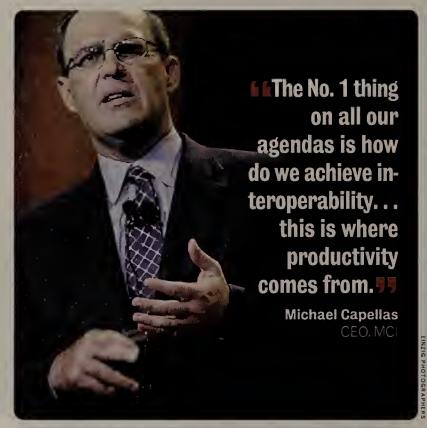
NEW YORK — The three IP services launched last week by MCl at the inaugural CeBit America conference are key elements of the carrier's push to ensure interoperability across its networks, company officials said.

The carrier announced its IP VPN Remote service, which lets customers couple IP and traditional data networks on a single VPN. The service lets users maintain existing frame relay or ATM network connections as they upgrade new locations to IP, all while using one VPN.

In late April MCI previewed the service, called Secure Internet Gateway, to link its dial-up and dedicated IP,ATM and frame relay networks. The service, which uses Nortel gear in the network, not only integrates various offerings but also eliminates the need for some devices at the customer's premises.

Customers will not have to support a device at their sites for dial-in users, says Brian Washburn, analyst at Current Analysis. "Some companies don't have the internal resources to manage these devices and some can't justify the cost when you may only have a few remote dial-in users," he says.

MCl Chairman and CEO Michael Capellas talked about the importance of interoperability during his keynote speech at the show. "The No. 1 thing on all our agendas is how do we achieve interoperability ... this is where pro-



ductivity comes from."

While MCI's IP VPN Remote service offers a clear migration path to IP,AT&T and Sprint have offered unified VPN support for more than a year. Both offer a single network

management view into their VPNs whether they are on frame relay, ATM, dedicated or dial-up IP.

MCl also revealed plans to roll out a Wi-Fi service and a new satellite offering later this year.

The carrier is teaming with Wayport to offer business users wireless LAN (WLAN) connectivity throughout the U.S. Users will be able to connect to the Internet or corporate VPNs through one of Wayport's 600 access points.

MCl says it is still working out how much the Wi-Fi offering will cost, but the pricing model will be based on usage. The Wi-Fi service is expected to be available next month.

AT&T earlier this month announced plans to offer Wi-Fi access to its Internet access customers, but the carrier said Wi-Fi access to VPNs would not be available until next year.

Sprint says it, too, is launching managed wireless support for its data and VPN customers next month, but the carrier is using WLAN technology. Sprint plans to offer wireless data support through its Sprint PCS division over its nationwide wireless network. While Sprint PCS has offered standard Internet browsing, which some companies use to support their internally managed VPN, this is the

first time Sprint will offer a fully managed wireless VPN access option.

In addition to launching WLAN support, MCI is See MCI, page 14

Vendors promise to improve on security appliances

Security functions bundled together result in fragmented management.

■ BY ELLEN MESSMER

NEW YORK — Four leading security vendors acknowledged that their products lack a unified management approach, but promised to improve the situation in the coming months.

Security management directions were just one of myriad topics debated by Cisco, Network Associates, Nokia Internet Communications and Symantec executives at Network World's Security Showdown last week at CeBit America. A volley of questions — from Network World Editorial Director John Gallant and vendors quizzing each other — shed some light on what customers can expect to see from these four vendors in the near future.

Cisco is creating Web-based automated design tools for question-and-answer input with customers and partners that when used, would produce a network diagram that would map to a security policy for data, storage or video, according to Jeff Platon, Cisco's senior director of product and technology marketing for security

Gallant queried Platon on Cisco's bewildering management approach to its growing collection of security software, appliances and blades.

Management options include "Cisco Security Device Manager, the CiscoWorks Security Information Management Solution, the Cisco IP Solution Center Security Technology Module for Management and the CiscoWorks VPN Security Management Solution," Gallant noted, and then asked: "Why do you have so many security management offerings, and do you plan to unify all security and device management in one product?"

"The simple answer is yes," Platon said. "We'll get to fewer ones."

Although Platon said he didn't see the embedded device managers going away anytime soon, he acknowledged that today Cisco has two management interfaces for workflow and provisioning, and "we do need to come to a common platform," and that work is underway. But that probably won't happen for another 12 to 18 months.

But the goal, Platon said, is that

customers will see a common architecture for different interface types to manage both provisioning and workflow where "policy can be pushed out to a different functional group."

Meanwhile, Network Associates has its own management consoles for its WebShield line of antivirus messaging appliances and the Sniffer protocol-analysis appliances to which it intends to add IntruVert Networks' intrusion-detection and intrusion-protection systems, which in turn is managed separately today.

Christopher Thompson, Network Associates vice president of product marketing, said a common management platform is a goal — but don't expect it for about nine months.

Nokia's security appliances are based on third-party security software from Check Point, Internet Security Systems (ISS) and Trend Micro. Dan MacDonald, vice president of Nokia, said the Nokia Horizon Manager is intended to "rapidly deploy software, do backups and restore" of Nokia appliances, but can't manage Check Point, ISS and Trend Micro security software running on general-



During Network World's Security Showdown at CeBit America security vendors promised unified management. Shown from left are Jeff Platon, Cisco; Christopher Thompson, Network Associates' Sniffer Technologies; Dan MacDonald, Nokia; and Charlie Johnson, Symantec.

purpose servers.

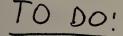
MacDonald said the best interaction between vendor management consoles is between Horizon and Check Point's management products.

"Check Point does have products that interface with Nokia Horizon Manager with minimum double entry," MacDonald said. There's also effort to improve integration between Nokia and Trend Micro management products, but that will not be available until the third quarter.

Because ISS recently began offering its own brand of hardware appliance without help from Nokia, one question posed asked whether Nokia's partnership with ISS is turning into more of a competition.

MacDonald said the partnership with ISS is solid, but acknowledged there is now "an amount of overlap" in appliances from ISS and Nokia that could have the two vendors fighting for customers.





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HP tells corporate users to adapt

Users concerned new utility computing initiative will involve costly upgrades.

BY DENISE DUBIE

CHICAGO — HP software users last week learned that if they want to take advantage of a new program that promises better automation software and service management products, it might mean using a forklift more than they'd like.

HP in May introduced its Adaptive Enterprise strategy, a

road map that defines how the company will integrate hardware, software and services to help customers quickly respond to changing resource needs and thus help their organizations run more efficiently. Last week the company expanded on its vision at its annual user conference, the HP Software Forum in Chicago.

Company executives described three stages IT managers

must tackle and complete before becoming truly adaptive, by HP's definition. The first stage, says Nora Denzel, senior vice president of HP's Software Global Business Unit, would require users to assess their networks and retool, re-architect and reengineer their infrastructures to support automation and service management across networks, servers, storage and applications.

While HP remained lean on the specifics of retooling, it was clear customers would have to make infrastructure changes before they could deploy the software or enjoy any of its automation benefits.

"That was an awakening for me," says Jason Kennedy, systems management analyst at Best Buy Canada in Vancouver, B.C. "It makes a certain amount of sense in terms of the long-term plans, but it also makes convincing others to go along with it more of a challenge."

Kennedy, who works alongside peers in application development and help desk support areas, says being in charge of enterprise systems management for the retailer puts him in a position to touch all areas of IT at Best Buy Canada. He's working to establish a service-oriented approach to management meaning managing a group of network resources as one service, rather than checking the availability of individual devices - but he first needs to sell the idea of change to people who've become accustomed to how they manage IT.

"It's hard to convince people to automate, even something simple like generating trouble tickets because they don't trust the technology, and they fear it will cause a lot of false alerts," Kennedy says. While only in the beginning of adopting HP's strategy, he says he realizes he has a long way to go to achieve the vendor's vision — if he decides to do so

The second stage IT managers must overcome to become adaptive is business efficiency, in which network elements are managed as business services, and the third, dubbed business agility, is when the software and hardware infrastructure dynamically adapts to meet the changing needs of the business.

Tim Hagn, vice president of IT operations and engineering at Zurich Life in Schaumburg, Ill., says his infrastructure and software for managing services falls in line with business service management as HP describes it. His team in the past two years has worked to get processes in line and people on board, and the IT department directly supports the company's mission-crit-

ical business services. But in terms of changing infrastructure and moving to the "ultimate state of fitness," as HP calls it, he's not certain yet Zurich Life will make that leap.

"You get to a point of diminishing return. At some point, it doesn't make sense to spend the money and make the stretch to adopting leading-edge technology," Hagn says. "You have to ask, 'Is it worth it for our business model?'"

While he doesn't see Zurich Life ripping, replacing and/or buying more hardware solely to become more adaptive, Hagn says he will keep the forward momentum in mind when infrastructure changes and hardware expenses arise for other reasons.

"I don't know many people whose capital budgets would allow them to switch servers on a whim," Hagn says. "But I could see an opportunistic approach to it that when new hardware and servers are needed, they are brought in under the service management strategy."

Sudip Gangopadhyay intends to wait until OpenView users such as Kennedy and Hagn prove HP's technology can do what executives say it can. The manager of Unix technical services for Georgia-Pacific, a manufacturing company in Atlanta, says his only plans in regard to HP's Adaptive Enterprise are to wait and see.

"Adaptive computing right now is a premature concept. I need to see proven results before we consider it," he says.

Nortel tries to stack up

High-speed stackable switch on tap.

■ BY PHIL HOCHMUTH

Nortel this week is expected to unveil new switches that it promises will boost resiliency and throughput in enterprise wiring closets.

The BayStack 5000 is aimed at corporations that want high-density 10/100/1000M bit/sec connections to desktops, and high-speed interconnects among the switches for providing fast uplinks and failover capabilities. For a modular approach to wiring closets, Nortel is offering the PassPort 8300, which promises high-density 10/100M bit/sec and Gigabit port densities and power over Ethernet (PoE).

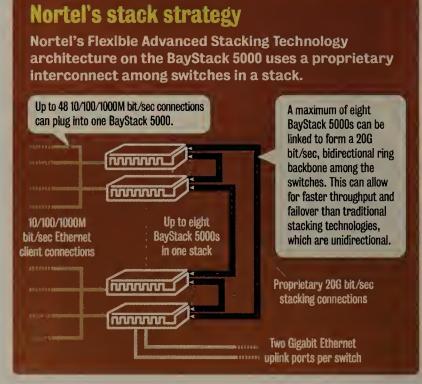
The new stackable switch comes in 24- and 48-port versions with all ports capable of supporting 10/100/1000M bit/sec Ethernet connections. The box has two

mini Gigabit Interface Converter slots for uplinks to a distribution layer or backbone switch.

Nortel is introducing what it calls Flexible Advanced Stacking Technology on the BayStack 5000. The technology uses a proprietary 20M bit/sec interconnect technology (a derivative of the InfiniBand standard) to link up to eight stackable switches in a bidirectional loop (see graphic). Nortel says this architecture can offer faster failover and more bandwidth between switches than competing stacking technologies from 3Com and Cisco. Other features in the switch include Layer 2 to 4 quality of service and traffic shaping, and 802.1x authentication support.

The high-availability and security features included in the BayStack 5000 follow a trend toward putting more switching intelligence at the LAN edge, says Joshua Johnson, an analyst with Synergy Research Group.

"Vendors are putting these features in wiring closet boxes to support new applications," such as IP telephony; instant messaging and IP video, which require low network latency and high bandwidth Johnson says.



Analysts say the BayStack 5000 will compete with Cisco's recently announced Catalyst 3750 and its StackWise technology. Another comparable offering is 3Com's XRN technology for tying together fixed-configured boxes at high speeds.

As for the PassPort 8300, the product is a revamped PassPort 8600 chassis (a six- or 10-slot box) with a smaller switch fabric. It also uses the base 8600 operating system software reconfigured to support wiring closet deployments, instead of the LAN core or metropolitan-area network edge duties usually associated with the 8600. Blades for the Passport 8300 include a 24- and 48-port 10/100/1000M bit/sec card, and a 48-port blade that supports 802.3af inline power. A specific chassis is required for PoE.

The BayStack 5000 is expected to be available in October, priced starting at \$9,000. Nortel says a PoE version of the switch is due in the first quarter of next year. The PassPort 8300 is scheduled to be available in October and will start at about \$85,000 for a 10-slot chassis, seven PoE modules and redundant power supplies, and switch fabrics.



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The skinny on SCO and IBM

The SCO Group and IBM continue to face off over Unix, Linux and intellectual property. The legal case, in which SCO accuses IBM of misappropriating Unix code to beef up the scalability of Linux, is bringing the world of open source software front and center at the same time that Linux is gaining a foothold in data centers. IBM maintains that it has done nothing wrong and is ignoring SCO's latest pronouncement that it has terminated Big Blue's license to sell Unix. We talked to users and industry experts to compile answers to frequently asked questions about the key issues.

Now that SCO has revoked IBM's license to Unix, what does this mean for AIX? Should users be worried?

Everybody using AIX, or thinking of using AIX, should be paying attention. But that doesn't mean users should be scrambling to scrap AIX. IBM says it remains committed to AIX and its customers. It's important to note that AIX represents untold millions of dollars in investment by IBM, which is unlikely to take this lightly. In addition, as opposed to Linux users who are dealing with an open source product and have access to code, AIX is licensed from IBM and therefore users aren't handling actual code. Big Blue has stated repeatedly that its Unix license is "irrevocable, perpetual and fully paid" and that it cannot be terminated. It also says it will continue to ship, support and develop the operating system.

What about Linux users? Should users reconsider Linux deployment plans?

It wouldn't hurt users to review contracts with Linux vendors to determine where the code originated and to guard against being held liable if SCO's claims are validated. In addition, some analysts suggest holding off deploying Linux in critical business systems until the merits of SCO's claims are determined. That could take years, however, and many users say they are unfazed by the situation. What's more, the open source community says it will alter any offending code.

What does the legal community think of SCO's allegations? Is IBM vulnerable?

One thing attorneys seem to agree on is that the case is murky. A lot is unclear: whether SCO holds patents to Unix, whether proprietary Unix code found its way into Linux and if so where it originated, among others. This is a David and Goliath battle, but the legal community does not discount SCO. This case likely will be a test for open source licensing.

Will this result in changes in how Linux is developed?

Observers say Linux will be developed in a more organized fashion, but this isn't necessarily driven by the situation with SCO. As Linux becomes more widely used by companies, these customers will be looking for the structure they find with proprietary software. Linus Torvalds' move to Open Source Development Labs last week will help

MCI

continued from page 10

expanding its support of satellite services. The carrier is teaming with Tachyon to roll out its second satellite offer. Today MCI resells Hughes Network Systems' DirecWay very small aperture terminal service to business users.

MCl says the Tachyon offer will fill a gap for users who need higher bandwidth support. Tachyon's satellite offering supports up to 256K bit/sec upstream and 1M bit/sec downstream. The DirecWay service maxes out at 70K bit/sec upstream.

The service provider says the satellite offering might be a good alternative for users who want to use a single access method for all locations even those that are rural or remote.MCl also says the service might be a good alternative for users who want a T-1 but find the cost of a dedicated line too high.While MCl says Tachyon's service will cost less than a T-1 connection, the carrier would not provide pricing or service-level agreement details.MCl says this offering will be available by year-end.

Heating up

Since SCO filed its lawsuit against IBM in March, neither side has shown any signs of backing down. The latest developments:

June: SCO shows analysts copies of Linux source code it says was lifted illegally from Unix.

June 6: SCO presents documentation it says proves that it was granted all rights and copyrights to Unix and UnixWare when it bought them from Novell in 1995. Novell earlier said that it hadn't transferred copyrights to SCO.

June 16: SCO says it has terminated IBM's right to sell AIX. It also files an amendment to its original lawsuit against IBM, upping the damages it seeks to more than \$3 billion and asking for a permanent injunction to stop IBM from selling AIX Unix. IBM contends that it is doing nothing wrong, that its Unix license with SCO is irrevcable, and that it will continue to support, ship and develop AIX.

bring this structure by creating a central clearinghouse for Linux development where users can look for software road maps and updates.

SCO alleges that IBM's actions have harmed its business. What was SCO's business before this suit arose?

SCO's business has been focused on Unix and supporting Unix in corporations. In its complaint, SCO talks about IBM's efforts to undermine Unix and push the use of Linux in enterprise data centers. That's the main reason why IBM pulled out of Project Monterey in 2000. Project Monterey was an undertaking of SCO, IBM and Sequent to create a version of Unix to run on both 32- and 64-bit Intel chips. But in the process of working on that, IBM saw the trend of Linux adoption growing and decided to focus on Linux rather than spend more time and money enhancing Unix. That left SCO hanging. In the following years, SCO has seen its business decline. Since CEO Darl McBride took over last year, SCO has focused on protecting its intellectual property, which some analysts say will be its primary business focus going forward.

Why did SCO file this suit?

Many observers say this is a last-gasp effort of a company that has watched its primary business decline. But others say SCO has every right and reason to protect its intellectual property. In January, SCO created SCOSource, a division focused on protecting and licensing intellectual property. Two licensing deals in its second quarter provided SCO with \$8.8 million and its first-ever net income. The company reported net income of \$4.5 million for the second quarter on revenue of \$21.4 million, compared with a net loss of \$6.6 million on revenue of \$15.5 million during the same quarter a year ago.

Who owns Unix?

That's a somewhat tricky question. SCO bought the rights to license Unix from Novell in 1994, a year after Novell purchased Unix System Laboratories, AT&T's wholly owned subsidiary responsible for Unix System V. At the same time, Novell transferred the Unix trademark to The Open Group (then known as X/Open Company). The Open Group is responsible for certifying that Unix products conform to the Single Unix Specification, regardless of vendor. SCO says it owns Unix copyrights and patents. However, SCO's claims against IBM do not include copyright or patent violations, rather breach of contract.

Deni Connor and Jennifer Mears

■ Editor in chief John Dix says SCO appears to be oversimplifying the market and ignoring case history. But no matter how it comes out, the open source community suffers. PAGE 58.

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Verizon, unions seek accord as strike date looms

BY JIM DUFFY

Verizon last week began contract negotiations with two unions in an effort to avert

a crippling strike.

The regional Bell operating company entered into collective bargaining talks with the Communications Workers of America (CWA) and the International Brotherhood of Electrical Workers (IBEW) to reach an agreement on contracts for some 75,000 employees. The current contracts expire at midnight Aug. 2.

A strike, observers say, would affect Verizon's deployment of equipment, potentially its ability to deliver services, and the overall economy. The RBOC says it would spend between \$13 billion and \$15 billion on equipment and related materials this year, but so far has spent less than 20% of that, according to industry reports.

Verizon is looking for employees to pick up a larger share of their medical benefits and to reduce absenteeism. Currently, employees pay about 5% of their healthcare, while the average in corporate America is 26% to 27%, according to Verizon.

"They do not pay a premium, which is unheard of," a spokesman said. "There are probably 40 different resolutions to this."

The absentee rate is 6%, "about twice the norm," according to the spokesman. Absenteeism costs Verizon \$600 million per year, while health benefits for the 75,000 employees costs \$1 billion per year and are rising 12% annually, he says.

However, the unions are looking to keep the current contract language while seeking improvements, says Jerry Leary, vice president of IBEW Local 2222.

"We want to strengthen job security, gain better medical benefits," Leary says. "At this point we're miles apart, but you would expect that as negotiations open."

The CWA also reportedly is hinging successful negotiations on its ability to organize Verizon Wireless, but Verizon says previous attempts to unionize have been unsuccessful over the years. Also, an existing agreement between Verizon Wireless and the union over how the wireless operation can be organized does not expire until 2004, Verizon says.

"I'm not sure why this should be the major issue," the RBOC's spokesman says. "The focus should be on the 75,000 employees whose contract is expiring."

The CWA did not return calls seeking comment.

Although negotiations just began and the contract does not expire for another six weeks, Leary says the unions are "more prepared than ever" for a work stoppage. "But we hope it doesn't come to that," he says.

Others expect the worst.

"We think a large-scale strike is likely this summer," Goldman Sachs analysts Brantley Thompson and Christopher Fine wrote in a recent report. "Verizon may seek to accelerate installs before the strike — thus, the flow of capital spending from Verizon over the next two to three quarters should be interpreted in light of labor conditions. A short-term uptick will not constitute a trend, nor will a strike-driven downtick."

The last strike at Verizon was a three-week, 88,000-employee work stoppage in 2000. In 1989, when the RBOC was known as NYNEX,62,000 employees walked off the job, slowing telecom services for 100 days in what was one of the nation's most disruptive strikes. It resulted in the CWA winning most of its concessions.

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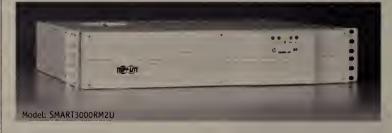


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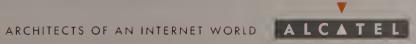


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IP Telephony/VoIP Design Guide

AN ALCATEL WHITE PAPER

April, 2003



If bandwidth were the anly issue, LAN-based IP telephany networks would have been deplayed years aga. But other elements, such as bandwidth hungry business applications, advancements in telephane technology, and network cangestion have been the majar stumbling blacks. Mast af thase issues have been resalved with newer VaIP technology, QaS, and the use af bandwidth managers ar camplex queuing schemes deplayed an the LAN and WAN.

Voice Quality

Over the years vaice quality has been very subjective: picking up the phane and listening to the quality of the vaice. If you had two different users on the same call you may even receive reports of varying results. After years of research, human behavioral patterns have been recorded and scared, establishing an objective measurement of call quality.

The leading subjective measurement of vaice quality is the Mean Opinian Scare (MOS) as defined in the International Telecommunications Union (ITU) recommendation P.800. Mapping between network characteristics and quality scare make MOS valuable for doing network assessments and tuning.

A MOS scare can range fram 5 (very satisfied) to 1 (nat recammended), but keep in mind that each vaice cadec has a benchmark scare based an several factors, including packetization delay and the inherent degradation that accurs when canverting the vaice to a digital signal. The highest MOS rating any cadec cauld receive is 4.5. Each cadec is given a MOS value based an any knawn impairments for the speed of the conversion, speech quality, and data lass characteristics. Belaw is a listing of the mast camman cadecs used to taday for VaIP and their theoretical maximum MOS value.

| Cadec | Default data rate | Time between packets | Packetizatian delay | Default jitter buffer delay | Thearetical maximum MOS |
|---------------|-------------------|----------------------|---------------------|-----------------------------|----------------------------|
| G.711u | 64 kbps | 20 ms | 1.5 ms | 2 datagrams (40 ms) | 4.4 |
| G.711a | 64 kbps | 20 ms | 1.5 ms | 2 datagrams (40 ms) | 4.4 |
| G.729 | 8 kbps | 20 ms | 15.0 ms | 2 datagrams (40 ms) | 4.07 |
| G.723.1 MPMLQ | 6.3 kbps | 30 ms | 37.5 ms | 2 datagrams (60 ms) | 3.87 |
| G.723.1 ACELP | 5.3 kbps | 30 ms | 37.5 ms | 2 datagrams (60 ms) | 3.69 |

Saurce: Vaice Over IP, 2nd edition

Each network will have a different MOS value based an QaS, delay and cadec that is deplayed in the IP network. When deplaying an IP telephany network the gaal is ta get the network to support the maximum MOS value and to achieve the best quality far vaice traffic. All MOS values above 4.0 are cansidered to be tall quality speech.

Converting Voice into Data Packets

Digital signal pracessars (DSP) – the engines far vaice caders – are making their way into IP telephany systems. The DSP is a specialized pracessar that has been in use far many years in other telephane applications such as mabile wireless networks. The DSP needs to be very fast due to the camputation intensive aperations required to pracess a typical telephane call. In essence, the DSP is what converts analog vaice signal into data packets so they can be transported over an IP-based network.

In this document, DSP refers to the cambined efforts of DSPs and cadecs to perform the conversion of analog and digital signals into IP cammunication flaws. DSP works by clarifying or standardizing the levels or states of a digital signal. A DSP circuit is able to differentiate between human-made signals, which are orderly, and noise, which is inherently chaotic.

Typically, the vaice-cading algarithm used for on IP telephony or VoIP network in a LAN environment is G.711, which divides a voice stream up into 64 Kbps packet increments. It is regarded as tall quality. Some of the other more widely available voice coding algorithms/compressors on the market are the G.729a and G.723 cadecs. The G.729a and G.723 cadecs are normally used for WAN connections where bondwidth is at a prequirement. The majority of vendors who suppart IP telephany recommend the G.729a cadec due to its superior quality over G.723, making it the de facta standard for WAN connections running IP telephany.

The chart below shows the bondwidth colculation for each codec.

| Voice coder | Voice bandwidth Kbps | MOS | Codec delay | Pocket size (bytes) | iP/UDP/RTP headers (bytes) | cRTP | L2 header (bytes) | Total BW | BW with silent suppression |
|-------------|--|-----|-------------|------------------------|----------------------------------|------|----------------------|----------|----------------------------|
| | Ethernet Control of the Control of t | | | | | | | | |
| G.711 | 64 | 4.1 | 1.5 | 160 | 40 | | 14 | 85.6 | 42.8 |
| G.711 | 64 | 4.1 | 1.5 | 160 | | 2 | 14 | 70.4 | 35.2 |
| G.729 | 8 | 3.9 | 15 | 10 | 40 | | 14 | 29.6 | 14.8 |
| G.729 | 8 | 3.9 | 15 | 10 | | 2 | 14 | 14.4 | 7.2 |

| | PPP | | | | | | | | | |
|-------|-----|-----|------|-----|----|---|---|------|------|--|
| G.711 | 64 | 4.1 | 1.5 | 160 | 40 | | 6 | 82.4 | 41.2 | |
| G.711 | 64 | 4.1 | 1.5 | 160 | | 2 | 6 | 67.2 | 33.6 | |
| G.729 | 8 | 3.9 | 15 | 10 | 40 | | 6 | 26.4 | 13.2 | |
| G.729 | 8 | 3.9 | 15 | 10 | | 2 | 6 | 11.2 | 5.6 | |
| G.723 | 6.3 | 3.9 | 37.5 | 30 | 40 | | 6 | 16 | 8 | |
| G.723 | 6.3 | 3.9 | 37.5 | 30 | | 2 | 6 | 8 | 4 | |

| | Frame Relay | | | | | | | | | |
|-------|-------------|-----|------|-----|----|---|---|------|------|--|
| G.711 | 64 | 4.1 | 1.5 | 160 | 40 | | 4 | 81.6 | 40.8 | |
| G.711 | 64 | 4.1 | 1.5 | 160 | | 2 | 4 | 66.4 | 33.2 | |
| G.729 | 8 | 3.9 | 15 | 10 | 40 | | 4 | 19.7 | 9.9 | |
| G.729 | 8 | 3.9 | 15 | 10 | | 2 | 4 | 9.6 | 4.8 | |
| G.723 | 6.3 | 3.9 | 37.5 | 30 | 40 | | 4 | 15.5 | 7.8 | |
| G.723 | 6.3 | 3.9 | 37.5 | 30 | | 2 | 4 | 7.6 | 3.8 | |

| 12 | ATM | | | | | | | | | |
|-------|-----|-----|------|-----|----|---|---------|------|------|--|
| G.711 | 64 | 4.1 | 1.5 | 160 | 40 | | 5 cells | 106 | 53 | |
| G.711 | 64 | 4.1 | 1.5 | 160 | | 2 | 4 cells | 4 | 42.4 | |
| G.729 | 8 | 3.9 | 15 | 10 | 40 | | 2 cells | 2.3 | 14.1 | |
| G.729 | 8 | 3.9 | 15 | 10 | | 2 | 1 cell | 14.1 | 7.1 | |
| G.723 | 6.3 | 3.9 | 37.5 | 30 | 40 | | 4 | 22.3 | 11.1 | |
| G.723 | 6.3 | 3.9 | 37.5 | 30 | | 2 | 4 | 11.1 | 5.6 | |

Table 1 - Bandwidth calculation by voice code

Buffering and Error Checking

Due to the bursty nature of business applications, data networks have large buffers built into them to sustain large bursts of traffic over a shart period of time.

Large buffers in a vaice network will anly increase the delay of time sensitive traffic and cause paar call quality. Vaice is very similar to constant bit rate (CBR) traffic – it requires a predictable, reliable throughput.

The majarity of the LAN protocals used to transport data traffic include end-to-end error checking. Sa, if a packet is delayed ar last, the ariginating station will retransmit a capy of the frame. The end station will wait for the acknowledgement, then reassemble the packet stream and pass it an to the application. This is usually transportent to the user.

Vaice transmissians an the ather hand are very time sensitive. The ariginating statian daes nat capy the transmitted frame into a buffer, since it would anly increase the delay and degrade quality. With vaice, if you lase a frame, it is last. Bath error and frame sequence checking is dane at the upper level of the Real Time Protacal (RTP), but due to the time sensitive nature of the vaice stream, if the frame is aut of sequence it will be discarded and the next frame will be processed, thus affecting the quality of the call.

The majarity of vaice cadecs can support minar frame lass, but the canversation will be chappy and of paar quality. Same of the IP telephany equipment manufacturers have tried to campensate for paar line quality by playing the preceding vaice frame a second time, but this does not resolve the issue, it only makes it talerable. This is why it is so important to understand the inherent behavior of vaice running on a data network and the additional requirements like QaS and predictive delay that a network must meet.

IP Telephony/VoIP Audit

An IP telephany/VaIP audit shauld be perfarmed far every prapased LAN/WAN segment priar to the addition af IP telephany traffic. The key to designing an IP telephany network is an understanding of the underlying technology used to transport the IP telephany traffic. The design principles used to deplay a successful LAN based VaIP network will not necessarily work when you apply them to a WAN configuration, due to a number of factors including limited bandwidth. QaS and traffic isolation are the key factors for the LAN, but bandwidth, priority and delay are important to the WAN. This can make a significant impact on the installation.

The mast camman cause far paar vaice quality during a VaIP installation is inadequate WAN bandwidth to support both vaice and data traffic. If an audit was perfarmed priar to the installation, carrective action could have been taken to resalve the issue priar to deployment.

In same cases, a paarly designed WAN can be fixed by lawering the delay with fewer rauter haps, setting up QaS an the rauters ar increasing the amount of available bandwidth prior to the installation of voice. In other cases the salution may be to expensive ar to the addition of voice.

Bandwidth Management

If the MOS value is not in an acceptable range after campleting the IP audit and tweaking the installed vendor's suggested parameters, a bandwidth manager may be needed far a successful installation. Bandwidth managers allow the end user to define how much bandwidth is gaing to be used by each application and guarantee what percentage of the WAN bandwidth is gaing to be used by voice applications.

What is QoS and Why is QoS Needed?

Voice quality is directly offected by many factors that can be divided into five QoS dimensions that impact the end user experience:

- 1) Availability
- 2) Throughput (both committed and burst)
- 3) Delay or latency
- 4) Delay variation, including jitter and wander
- 5) Packet loss

Availability

Avoilability is the percentage of time that the network is up. The traditional benchmark for a voice network is 99.999% ("five 9s"), or about 5.25 minutes of downtime per year. Avoilability is a chieved through a combination of equipment reliability and network survivability. Avoilability is a probability calculation, so it is not simply calculated by summing the MTBF figures.

Throughput

Throughput is the omount of troffic – or bondwidth – delivered over o given period of time. Generally speaking in the LAN environment, more throughput is better.

For the mojority of WAN users, throughput depends on the omount of money poid to leose corrier focilities. So efficiency, compression, and bondwidth monogement ploy key roles in designing on IP telephony network.

Delay

Deloy or lotency is the overage transit time of a service from the ingress to the egress point of the network. Many services – especially real-time services such as voice communications – ore highly intolerant of excessive or unnecessary deloy. Interactive conversation becomes very cumbersome when deloy exceeds 100-150 ms, when it exceeds 200 ms users find it disturbing and describe the voice quality as poor. To provide high quality voice, the VoIP network must be copable of guaranteeing low latency. The ITU-T G.114 recommendation limits the maximum acceptable round trip deloy time to 300 ms between the two VoIP gateways (150 ms one-way deloy).

There are many components of delay in a network that must be understood, including packetization delay, queuing delay, and propagation delay.

- *Packetization Delay* is the omount of time it tokes the codec to complete the onolog to digital conversion. Realize that IP telephony/VoIP always creates some measure of delay, as the algorithm specifies to "listen" or sample the voice for a specified period, followed by packetization.
- **Propagation Delay** is the omount of time it tokes information to troverse a copper, fiber, or wireless link. It is also a function of the speed of light, the universal constant, and the signaling speed of the physical medium. For example, if a coll has to pass through a transit node more delay is introduced.
- Queuing Delay is imposed on a pocket of congestion points when it woits for its turn to be processed while other pockets are sent through a switch or wire. For example, as previously stated ATM mitigated queuing delay by chapping pockets into small pieces, pocking them into cells, and putting them into obsolute priority queues. Because the cells are small, the highest priority queue can be serviced more often, reducing the woit time for pockets in this queue to deterministic levels. At gigabit speeds, however, the waiting time for high-priority traffic is very small even under the warst conditions, due to the speed of the links and available processing power.

Delay Variation

Deloy voriotion is the difference in delay exhibited by different packets that ore port of the same traffic flow. High-frequency delay variation is known os jitter, while low-frequency delay variation is called wander. Jitter is coused primorily by differences in queue wait times for consecutive pockets in a flow, and is the most significant issue for QoS. Certain traffic types—especially real-time traffic such as voice, are very intolerant af jitter. Differences in packet arrival times cause chappiness in the vaice. All transport systems exhibit some jitter. As long as jitter folls within defined tolerances, it does not impact service quality.

Excessive jitter can be overcome by buffering, but this increoses deloy, which con cause other prablems. With intelligent discard mechanisms, IP telephony/VoIP systems will try to synchronize a communication flow by selective pocket discord, in an effart ta avoid the "wolkie-tolkie" phenomenon caused when two sides of a conversation have significant lotency. Jitter must be less than 60ms (60ms = overage quality, 20ms = toll quality).

Packet Loss

Loss – either bit errors ar pocket drops – hos o bigger impoct on IP telephony/VoIP services than on data services. During a voice transmission, lass of multiple bits ar packets af stream may cause on audible pop that will became an onnaying to the user. In a data transmission, loss of a single bit or multiple packets of information is almost never noticed by users. In controst, during a videa broadcast, consecutive packet loss may cause a momentary glitch on the screen, but the video then proceeds as before. However, if packet drops become epidemic, then the quality of all transmissions degrades. Packet loss rate must be less than 5% for minimum quality and less than 1% for tall quality.

Class of Service

The moin objective of Resaurce Reservation Protocal (RSVP) is to guarantee end-to-end QaS throughout the network by reserving bandwidth unicost and multicost opplications on on individual flow basis.

Differentiated Services (DiffServ) is designed to group all flaws with the same service requirement into a single oggregate. For example: RSVP would reserve bandwidth for a single VaIP coll, while DiffServ would group all VaIP troffic together in the same flaw. This aggregated flow would then receive its class of service based on the application priarity.

When o QoS mechanism like DiffServ is enabled, it will provide complete flexibility in defining service closses that combe provisioned in a converged voice and data network. This means that the network management system provides occess to the mechanisms that allow the end user to create customized service closses for each application.

Most networks are deployed with some level of QoS at layer 3 that supports the following classes of service:

- Expedited forwarding (EF) for control frames like RTCP
- Assured forwarding (AF) for VolP traffic
- Best Effort (BE) for all other data traffic

It is possible to mop different QoS porometers to one onother (i.e., 802.1p to TaS or ToS to DiffServ) to enable the network designer to provision an "end-ta-end" closs of service for voice, video and doto troffic.

Deploying IP Telephony in a Converged Alcatel Network

Today's business depends on scoloble network communications that allow future expansion of business options and focilities. The graundbreaking OmniSwitch family (6600 series, 7000 series, and the 8800) and OmniPCX Enterprise voice products target that future networking and business solution. The OmniSwitch family series is a new line of data infrostructure switches that spans the care, edge, and desktop of networking. The design cambines Alcotel's experience and expertise building corrier and enterprise network equipment with all of the company's cutting-edge canvergence technologies.

e-Business salutians must pravide availability, security, intelligence, and manageability. These values are bath essential ta successful madern business and fundamental ta apprapriate new technalogy.

The OmniSwitch family affers carrier-class availability thraughaut all networking campanents to deliver the infrastructure mandatary far IP telephany and missian-critical applications. A multi-layered approach to security is affered, securing traffic to, through and between switch nodes, preventing unauthorized access to business traffic and ensuring privacy. Intelligence mandates that all switching decisions are distributed and performed at wire-rate. Alcatel's implementation is wire-rate into, through the backplane, and aut all network interfaces without performance battlenecks. Manageability involves both networking and management system features. One Tauch QaS means that camplex QaS policies are implemented cansistently with a simple point-and-click interface.

Deploying IP Telephony and VoIP in a Multi-Vendor Environment

Even though IP telephany and VaIP technology have made same vast reliability and quality impravements aver the past couple af years, custamers and network designers still struggle with implementing the technology in a multi-vendar network. There are many reasons for this such as: inter-aperability issues, proprietary protocols, and just plain ald finger painting. Please check with the manufacture af your installed equipment for their recommendations an how to design and deplay an IP telephany ar VaIP network in a multi-vendar setting.

Design Recommendations

One af the mast impartant recammendations that can be made is to pay clase attention to the infrastructure that the VaIP network is built an. The foundation must be salid atherwise there will be angoing quality issues until the network design issues are resalved. The mare time spent upfrant investigating and verifying the design of the LAN and/ar WAN will make a more successful ending. Verification is critical, and although it may seem reasonable to believe that the "network is new and should support QaS" it's important to check. In same cases, like running VaIP over a WAN, an audit is a must. For example, the total end-to-end delay to support a quality voice conversation must not exceed 200 ms and can only be verified by an IP audit. Remember, the langer the delay the worse the quality.

After a VaIP audit is prefarmed the designer must engineer the network to support the warst-case scenaria, even if it happens only 1 % of the time. Engineering the network for peaks not averages maintains the highest quality of voice traffic while the network is perfarming at its maximum patential.

When designing a VaIP WAN, the designer is required to calculate the amount of available bandwidth for all applications required to transit the link. In most cases the link traffic is miss-calculated or the IP audit is not performed prior to the installation and the quality of the VaIP calls suffer. As previously sated, a good rule of thumb for a WAN link is to keep at least 25 % of the bandwidth available for routing table and administrative updates.

As in mast architecture's, the mare redundancy and availability aptians designed into the network the better the adds are for a successful installation. The designer must also understand that engineering all of the redundancy aptians available into the system could adversely affect the performance of the network. For example, adding IP redundancy into the network could increase the jitter because the VaIP packets might take multiple paths to reach the end point. This is not a major cancern, but it must be evaluated prior to deploying the VaIP network.

Redundancy features cast real maney, so the main task of the design engineer is to make sure the product meets the customer's requirements and at the same time keeps the proposal price competitive. In same cases this could be the difference between winning and losing the appartunity.

The fallowing is a list of questions, thoughts, and ideas that should be considered and reviewed with customers/prospects when designing a VaIP network. It is unlikely that a network configuration will implement every feature an this list, but it's a good checklist to review prior to completing the final design.

VoIP Design Guide Check List

☐ Is the LAN equipment designed to support 99.999% availability?

- Is the LAN configured with the following redundancy options?
 - Monogement modules
 - Links
 - Protocols (i.e., Fost Sponning Tree)
 - Power supplies
 - UPS system (in the event of o power outoge) in the wiring closet
- How ore the IP phones going to be powered?
 - Does the LAN switch support in-line power (802.3of)?

Is it connected to a UPS system?

Does the IP phone model support in-line power?

• Is on externol power potch ponel required?

Is it connected to a UPS system?

• Are you using local power?

Is it connected to o UPS system?

Whot is the rotio of IP phones with UPS to IP phones without UPS?

Are digital/onolog terminals intermixed with the IP phones in geographic layout to provide for "emergency dialing" in the event of power or network outages?

- Is the PBX configured with the following redundoncy options?
 - Monogement modules
 - Redundont IP modules
 - Are the VoIP links connected to multiple LAN switches?
 - Is the switch configured to support bottery bock-up power?
 - Is there o bock-up signoling poth configured for oll networked sites?

☐ Does the installed LAN equipment support QoS?

- Do you know the speed and performance of the installed equipment?
 - Monufocture
 - Product type
 - Link speeds and WAN protocols
 - Routing Protocols
- What is the QoS design strotegy?
 - 802.1p/Q
 - DiffServ
 - Is the priority set and respected on every LAN switch in the network?
- ToS (type of service) or CoS (closs of service) for the WAN
- Do you have a current local area network diagram? This is a must.
 - When was the network diagram last updated? If it's older then 45 days, ask for an up to date diagram.
 - Hos the coble plant been verified to support 100 Mbps Ethernet? (i.e., Cot 5 coble)

Isolation

- Do you have an isolated VLAN configured just for VoIP phones?
- Has the excess broadcast traffic been removed from VoIP VLAN
 - Is IP multicast support enabled on the LAN?

☐ Does the installed WAN support QoS?

- Do you have a current wide area network diagram? This is a must.
- Has the packet forwarding latency and jitter been verified not exceed the maximum tolerance of the 200 ms. An IP audit is a requirement for all WAN connections.
- Is guaranteed bandwidth, packet forwarding rate and capacity specified for all WAN links? A good rule of thumb is to have a 25% available for overhead and routing table updates. Please refer to Table 1 for the bandwidth required for each codec.
 - Let's look at a simple calculation using the 25% rule, using a T1 (1.536 Mbps) as the line speed.
 - 1.536 Mbps -25% = 1.152 Mbps, so this means that both voice and data must share the available bandwidth.
 - Is a bandwidth manager required?

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Alcatel

26801 West Agoura Road Calabasas, CA 91301 USA

Contact Center

(800) 995-2612 US/Canada (818) 880-3500 Outside US

www.alcatel.cam/enterprise

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P/N 031358-00. 5/03



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ACCESS DEVICES SERVERS VPNS
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VolP brings change to the channel

Traditional telecom, datacom gear and service providers cope with convergence.

BY PHIL HOCHMUTH

CarrAmerica Realty faced some tough decisions when picking an IP telephony platform to replace its nationwide PBX infrastructure. But the harder choice was deciding on whom to partner with to in-

■ Nortel last week announced an interactive voice response server that could help midsize firms deploy selfservice customer service. The Media Processing Server 500 would let customers access information, place orders or make changes to records through speech commands over the phone. The server would sit in front of a call center PBX or automatic call distributor and tie into back-end CRM systems or other databases. Callers would maneuver through voice prompts and menus with speech commands, instead of dial-pad buttons. The MPS 500 is a smaller cousin of Nortel's MPS 1000 for large data centers and service providers. The platform works with Nortel PBXs and automatic call distributors, and non-Nortel telephony gear. The MPS 500 will be available in September, Nortel says. Pricing has not been released.

■ Avail Solutions last week rolled out the latest version of its back-up and recovery software. Integrity 1.45, which works with disk or tape back-up methodologies, now supports adaptive file transmission, automatic file grooming and support for FreeBSD servers. It automatically determines the best data-transmission protocol to use when backing up data, thus improving back-up speeds. Data grooming occurs offline and lets data be backed up to a storage device and then moved or copied to other devices for archival purposes. Integrity 1.4.5 is priced starting at \$850 and works with Window, Solaris and Linux networks.

stall and configure the convergence gear.

The company decided on Expanets, a reseller and integrator of Avaya and Cisco voice and data gear. The fact that Expanets had installed CarrAmerica's old Avaya IP PBXs and had an extensive background in voice was key, says Barry Krell, vice president and director of engineering at the Washington, D.C., company.

"It's been a huge change for Expanets to sell something other than Avaya for voice," Krell says. And while his firm was learning to deal with the transition from TDM voice to voice over IP (VoIP), in many cases the Cisco-Avaya channel partner supporting Krell was learning with him.

As more businesses look to convergence, VoIP technology is reshaping how companies buy telecom and datacom gear and services from resellers, and forcing these middlemen companies to regroup and reshape themselves.

Equipment vendors promote the productivity gains and cost reductions of convergence, but it's the channel partners and integrators that usually deal with companies shopping for IP telephony. And

how well these channel partners and value-added resellers (VAR) can handle the convergence shift could be reflected in how smooth, or rough, a VolP installation can go in a company.

"For the telecom resellers and the datacom guys, VoIP is a new thing, and both are having their struggles," says Troy Buck, senior sales manager at Teldata Enterprise Networks, a San Diego firm that resells Nortel and Toshiba telecom and VoIP gear to enterprise customers.

"Many telecom channel partners know PBXs and key systems, but they don't have much IP experience or knowledge about quality of service and routers," Buck says. "They come from the background of tip and ring [nomenclature for telephony wiring] and not the world of IP, QoS and routers."

From the data VARs' perspective, selling IP voice has some different challenges, says John Barker, director of operations at Versatile Communications in Marlbor-

Barker's firm, a traditional Ethernet switch and router integrator, took on selling VoIP products and installation a year ago, and the transition was tough. Learning the new technology and convincing customers to choose Versatile was a challenge at first.

"It's a chicken-and-egg issue," Barker says. "Last year we had a good data customer that was shopping for a voice system; they looked into what we offered for VolP, but they were wary of going with us because we were so new to the technology and the technology itself was new."

Telecom experience smoothes VolP rollout

Working with a strong TDM-voice company to install VoIP was a requirement for CarrAmerica's Krell.

Along with Cisco engineers, Expanets helped Krell do some things that a datacom-only VAR might not have been able to, such as splitting T-1 connections between the Avaya PBX and Cisco Call-Manager, which let the company gradually migrate from TDM to IP voice. The move also allowed more time for system testing and training, instead of a one-day cutover.

See VoIP, page 20

Cautious users cast wary eye on WLANs

■ BY TIM GREENE

WALTHAM, MASS. - The benefits of wireless LANs intrigue potential users and have them hopeful about the technology despite what they perceive as significant shortcomings.

That was the conclusion of a panel of corporate IT executives who recently spoke about enterprise IT strategies at a meeting of the Massachusetts Telecommunication Council.

In the wireless realm, security ranked tops among their concerns, but managing 802.11b and 802.11g wireless spectrum in urban areas and hospitals, and the restrictions of proprietary protocols also worried the group.

"We're going to populate our new building with a wireless LAN," said Bill Rebello, director of infrastructure and support for medical response provider Lifeline in Framingham, Mass. "We put a few in the old building to see how business responded to it. Users want it."

Lifeline is evaluating equipment with an eye on making sure data traveling over the wireless network can't be hacked. A simple test of the technology was enough to scare away Dianne Mortenson, MIS director for the Legal Sea Foods restaurant chain. She set up a small test LAN at the company's Boston headquarters, "and 1 could get into the LAN in the company across the street," she said. That was enough for her to put the technology on hold.

While wireless access in the restaurants might increase productivity of managers, she said she has to be convinced it wouldn't present a potential weak spot in Legal's network. Legal also hasn't figured out whether it would be good business to offer wireless Internet access to customers because it might encourage them to linger without buying more food. "We're not a coffee shop," she said.

Mortenson also said that the proprietary nature of security protocols for 802.11

See WLANs, page 20

Concerning IT

Wireless wasn't the only concern of speakers at the Massachusetts Telecommunication Council forum on enterprise IT strategies. Other hot topics included:

Spam: A service that will deal with the problem effectively.

Life-cycle management Eg La methods to ensure regular a world and upgrading of gear

Pricing flexibility: Adjustice me b vendors so small companies do have to pay big-entererise orice

Outsourcing: Financially stable providers that offer service level agreements with teeth.

Quick ROI: New projects get approved in most cases only if they have proven shorter paybacks.



Well, I was hoping to wear this new suede jacket I just bought, so I'm just kind of keeping my fingers crossed that it doesn't rain today.

IT guy has time

Greg Brown, 33, seen talking freely to co-workers after deploying Nokia Message Protector

"I used to spend most of my day managing all kinds of different security products like anti-virus and spam rejection for our email system," a beaming Greg told reporters at a recent a beaming Greg told reporters at a recent industry seminar. "Trying to plug holes between our desktops and gateways, looking after

Features
Automatic
Signature
Updates

all those scanning technologies, trying to keep them updated — all of that kept me in the trenches. But it changed with the implementation of Nokia Message Protector. Now

that we have secured communication paths, spam protection and intelligent exploit rejection I can come out of my bunker and get to know the come out of my bunker and get to know the people around me — I have already memorized all people around me people in the Finance the names of the people in the Finance the names of them are quite cool —





Introducing Nokia Message Protector.

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TOLLY ON TECHNOLOGY

Tolly



o profound is the effect of technology on our lives that "Ethernet at 30" jubilee articles have even shown up in the mainstream press. And, while I don't find myself disagreeing with the fundamental assertions in these stories, they leave out the key point that, compared with "Ethernet at birth," today's Ethernet really isn't Ethernet at all. (See related story, page 36.)

We need to first know where Ethernet "is," relative to the Open Systems Interconnection model. When formally defined, Ethernet (like FDDI and token ring) consists of just the lower two layers of the protocol stack. To make it a tad more confusing, the

Ethernet at 30

LAN media access control actually maps into Layer 1 and the bottom half of Layer 2.

Ethernet, oversimplified, is a frame format, using an access mechanism over physical cabling. Looking at each will help you understand why I make my assertion that today's Ethernet isn't really Ethernet.

In the beginning, Ethernet was all about connecting stations via physical taps into a coaxial network. Even before the more fundamental move up to Fast Ethernet, that part of the specification was replaced with the more familiar 10Base-T hub model. And, as time has gone by, the so-called Ethernet PHY has been revamped and reinvented time and again as required.

The distributed, multi-user aspect of Ethernet was probably the most important attribute — especially given the main-frame/hierarchical model that was prevalent at the time. Ethernet's approach was

known as CSMA/CD for Carrier Sense, Multiple Access with Collision Detection.

It worked fine in lightly loaded environments, but as traffic grew so did collisions, and effective throughput dropped. This forced many companies to create smaller and smaller groups of Ethernet. It also gave FDDI and token ring a chance to break into the marketplace.

Both of these LANs used a deterministic, token-passing scheme and, unlike Ethernet, could be driven to nearly 100% utilization without degrading. They also offered key features such as support for priority bits and larger frame sizes — elements Ethernet's architects did not provide.

So Ethernet "morphed" as its frame format was upgraded with four more bytes to provide virtual LAN and priority functions (IEEE 802.1p/Q). And while still not part of the standard, Jumbo Frames of 9,000 bytes commonly are supported on today's

Ethernet gear.

With the advent of switching, Ethernet left behind the most fundamental part of its heritage, CSMA/CD. A switched environment appears to each user as a dedicated LAN, thus no carrier sense, no multiple access and need for collision detection. Ethernet is no longer Ethernet. (CSMA/CD was included in the Gigabit Ethernet standard though rarely implemented. It is not included in the 10G Ethernet standard.)

At 30, Ethernet retains only the frame format from the original spec — and even that has been tinkered with. But it serves us well, and having one topology that combines the best of others is far better than supporting many.

Tolly is president of The Tolly Group, a strategic consulting and independent testing company in Manasquan, N.J. He can be reached at ktolly@tolly.com.

VolP

continued from page 17

Expanets also got rid of the old Avaya gear, which some datacom VARs reselling Cisco VolP said they would not do, he says.

CarrAmerica eventually replaced its home-office Avaya switch with a Cisco CallManager and rolled out 400 IP phones in its main office last year. The company plans to consolidate 60 of its offices nationwide onto the centralized CallManager and add another 500 IP phones across the country this year.

"They put a lot of time and effort into our project because they're a good company with smart people," Krell says of Expanets and Cisco. "But I'm sure part of the reason was to make sure it worked so we could be a reference."

New waves from a big fish

For many big corporations, the old way of telecom/datacom resellers translated to Nortel-Cisco or Avaya-Cisco. Convergence has shaken up this model, some integrators say, and equipment vendors are reacting in different ways.

"Cisco providers have become very responsive to RFPs that they wouldn't have been considered for in the past," says Mike Olsen, senior vice president of sales at NextiraOne, a provider of Alcatel, Cisco and Nortel voice and data gear and services. He says IP telephony is being approached in two ways: gradual migration, and rip and replace. Large companies with entrenched PBX systems such as Alcatel, Avaya, Nortel or Siemens often are opting to IP-enable those systems. Many businesses with a patchwork telecom infrastructure or companies that are moving to new locations are considering the pure-IP approach of vendors such as Cisco.

In the fourth quarter of 2002, Cisco had 44% of the \$191.7 million in VoIP revenues in North America, according to Synergy Research. Traditional voice leaders lagged far behind in the market, as Avaya (12% market share) and Nortel (8%) came in second and third, respectively.

Teldata's Buck says the fact that Cisco is now into voice has been a huge change in the channel.

"Cisco definitely has the ears of the IT departments, and they're making a lot of headway with that advantage," he says. "IT people see voice as just one more thing to run across their data networks." He adds

that Cisco's jump into the VoIP market also results from traditional-voice gear makers being slow to react to the VoIP market.

Versatile's Barker says his company resells Cisco equipment but focuses on HP switches and Mitel IP telephony gear. When you sell only Cisco VoIP and switches, "it might be you and 100 other resellers bidding on a Cisco project, cutting each other's throats," he says.

Choosing the right partner

From whichever path companies approach convergence, choosing the right third-party partner will be important for larger companies, one integrator says.

"It can be very complex and expensive

to re-create your voice network over your data network," says Darren Spohn, CEO of Spohn & Associates, an Austin, Texas, reseller of Cisco gear and AT&T services. "And no offense to the equipment companies, but it's not as easy as some might make it out to be."

He says customers can expect to see the telecom/datacom integration line become less defined as convergence gains more momentum.

"The business voice market is a very large market, and capturing it is a big business," Spohn says. "You'll see a lot of nontraditional voice companies trying harder to get a piece of it as the market evolves."

WLANs

continued from page 17

wireless gear makes her hesitant to use it as well

For John Powers, chief administrative officer for IS at CareGroup Healthcare System, interoperability is a requirement for wireless gear he installs in the group's hospitals, which include Boston's Beth Israel Deaconess Medical Center.

Powers said he hopes for interoperable authentication and encryption schemes between all wireless cards and all wireless access points so visiting doctors legitimately and safely can tap into hospital resources using their own machines. "Trying to accommodate people who work in two wireless environments who have their own [network interface cards] has not been easy," he says.

Meanwhile Kavin Moody, executive director of the Center for Information Management Studies at Babson College in Wellesley, Mass., said the school has embraced wireless for students and accepted that some aspects of it are proprietary. The technology has become an accepted tool for the school because the benefits outweigh

the risks. But he said he understands that other businesses need technical standards before they can jump onboard. I think it's a very industry-specific thing," he said.

Risks aside, Powers said frequency interference in hospitals also is a concern because 802.11 uses an unlicensed range that can bump against the radio frequency used by wireless medical telemetry equipment, potentially disrupting the LAN and medical gear. "We need to conserve air space within our buildings and make sure people don't introduce interference," he said. "We're looking for detection tools for radio interference."

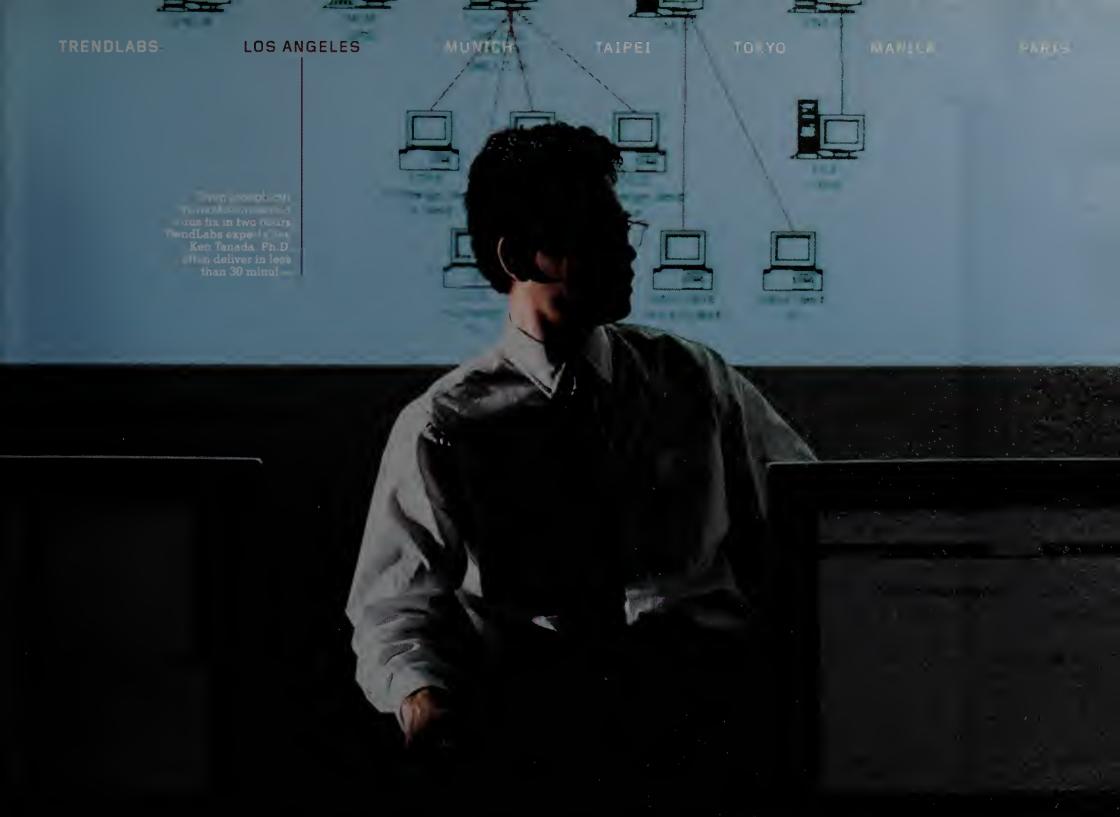
With sites in Boston, he expects the hospitals to face interference from wireless equipment in neighboring buildings as well. "My concern is that as hot spots increase, 2.4GHz for medical telemetry, microwaves, {radio frequency identification}, we will get an increase in frequency interference," Powers said.

Money for wireless purchases is part of CareGroup's 2004 budget and includes funds for a way to track down rogue access points. Powers said he's not necessarily opposed to these access points as long as they are properly secured. ■

VolP channel challenges

Value-added resellers of LAN, IP telephony and traditional phone gear are changing how some IT providers operate. Some tips for picking the right reseller to install your converged network.

- Find out how long a company has installed IP telephony equipment, and what vendor certification level the integrators and support staff have.
- If integrating IP telephony into a multi-vendor datacom and PBX infrastructure, find a partner with a strong background in telecom in addition to IP and LAN/ WAN expertise.
- For green-field installations where all new voice and data gear is going in (such as a newly built office), it could be easier to deal with smaller resellers that have a single-vendor LAN/IP telephony offering.



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Takes

■ Fortinet is adding intrusion-prevention software to its multi-function security platform, letting customers block a range of threats or suspected attacks. Version 2.5 of its FortiOS software for FortiGate appliances also upgrades its virus scanning intrusion detection, firewall and VPN capabilities. The package is configured to block more than 30 known attacks such as denial of service and distributed DoS, SYN floods and other protocol floods, buffer overflows, ping of death and port scanning. The software uses many means to block attacks, including dropping suspicious packets, resetting connections and blocking source addresses. The company also has added the ability to scan FTP files for viruses. Before, its anti-virus software could scan only POP3, Simple Mail Transfer Protocol, Internet Message Access Protocol and HTTP traffic. It can scan e-mails and filters based on different parameters such as sender, black lists and white lists and words and phrases in the body of the message. It also now can scan LZH compressed traffic and HTTP traffic that enters via firewall ports other than Port 80. Customers can set aside up to 15% of the memory on FortiGate gear to quarantine suspicious files until they can be examined. FortiOS 2.5 is available this month on new equipment and is available free as part of service contracts for existing customers.

■ Computer Associates this fall plans to ship security and policyenforcement software to fight viruses and spam, filter Web content in accordance with corporate use policies, and block peer-to-peer file sharing CA's eTrust Secure Content Man-

agement marks the first time CA has sought to integrate security for the Web, e-mail and file transfers into one software package. The software will run on Windows platforms and will include CA's desktop anti-virus product. ETrust Secure Content Management will cost \$55 per seat, but that is cut in haif for users of CA's anti-virus products who want to upgrade.

IBM users take on integration

IT executives discuss pros, cons of committing to business application integration.

■ BY DENISE DUBIE AND **MICHAEL COONEY**

NEW YORK — When faced three years ago with a \$100 million forklift upgrade of his infrastructure, Mike Sutten realized he needed to find another way to integrate data and business processes across 25 floating business units — his company's cruise ships.

Sutten, vice president of IT development at Royal Caribbean and Celebrity Cruises, said he needed to build a system that would let 25 cruise ships connected with an existing satellite-based WAN share information and support a variety of applications — in hopes of garnering more revenue. When he learned that about \$33 million of that \$100 million project price would go toward developing interfaces that would integrate the ship's myriad applications, Sutten decided to look for a

"The violent transformation we originally had in mind was just not feasible," he said.

Sutten recently spoke at IBM's Integration Day event, a gathering of IBM partners, executives, customers and press, to talk about application-integration issues. IBM also used the forum to announce new application adapters and security features for its WebSphere product line.

In Sutten's case, his company picked IBM WebSphere Business Integration Server to develop standard processes, integrate applications and build interfaces between the company's own applications and those of suppliers and partners. WebSphere Business Integration Server software sits between applications and lets them communicate with each other, without requiring customers to write specific interfaces for each application. IBM also develops adapters specific to popular applications, such as SAP and Siebel Systems.

The goal of Royal Caribbean's five- to seven-year plan is to develop a platform to which applications can connect and share data — which Sutten says is a step toward Web services for his organization.

Sutten and his team have built an interface to his dining room management application. He plans to build an integration interface for the food and beverage applications, and the cruise lines accounting and supply-chain systems - all of which come from different vendors.

Ideally, Sutten says, he would like to see suppliers and partners open up their applications via APIs to integrate with Royal Caribbean to enable more efficient credit card processing. The new system would **Cruise control**

Royal Carlbbean says it would need to build

interfaces to integrate data and applications with its 112 partners and suppliers — at an estimated cost of between \$10,000 and \$50,000 per interface.

charge guests fewer times and reuse the guest data across applications, rather than processing it in multiple instances.

Dan Vaught, manager of enterprise architecture and integration at Safelite Glass, spoke of how he needed to integrate data stored mostly on mainframes with distributed server systems, and partner and supplier applications.

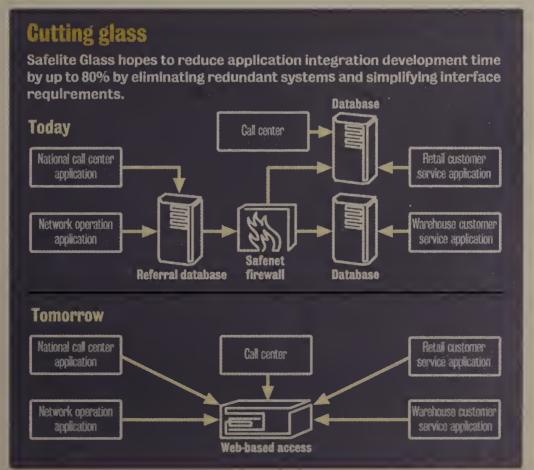
By using WebSphere Business Integration Server, Safelite will move to fewer, more common systems that will share a data model and let the company reuse application technology, rather than building new interfaces among applications from scratch. Vaught would not comment on the ROI he expects to achieve by deploying WebSphere, but he says using the software will let him build interfaces between applications in 20% of the time it normally would take.

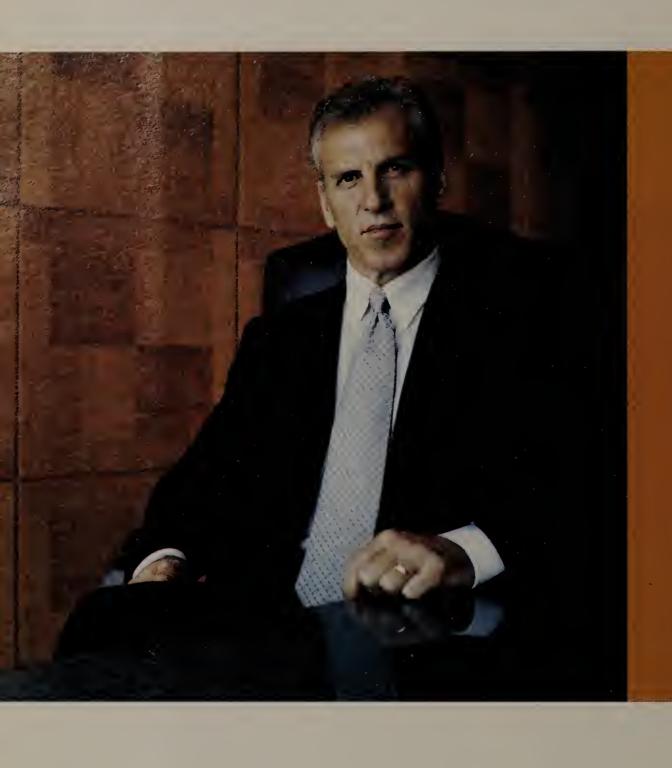
"My managers wanted to know that we would put a system in place that 10 years from now would be able to react to changes," Vaught said.

While Vaught is in the process of integration, and Sutten has just begun, they agree that business process and data integration projects are not without challenges.

"You have to be sure you are delivering some sort of value along the way and that you continue to meet business needs," Sut-

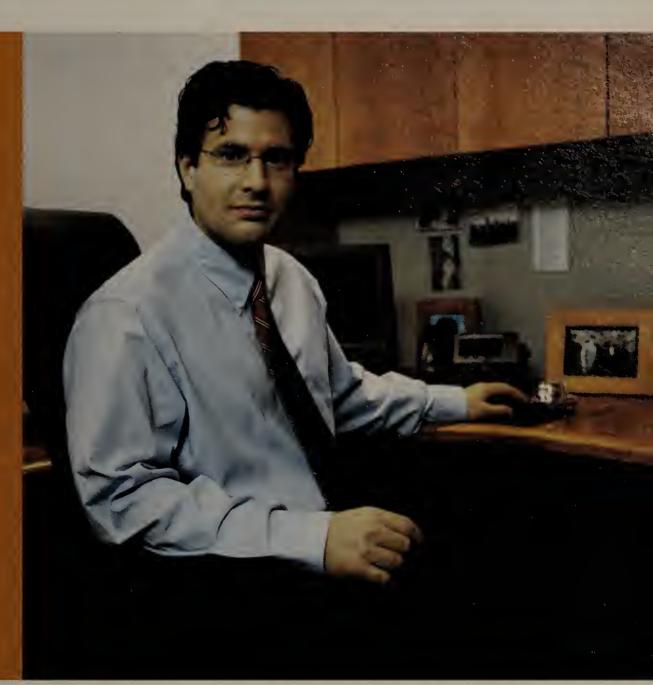
He added that management needs to know that the initial transformation to a shared data and process integration system has an end date, even though additional integration and interfaces can be added indefinitely.





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Security appliance adds P-to-P controls

BY ELLEN MESSMER

TippingPoint Technologies has announced an intrusion-prevention appliance that the company says can block a half-dozen peerto-peer applications, including BearShare, Gnutella, iMesh, Kazaa, Limewire and WinMX.

TippingPoint's UnityOne 200 is a gateway appliance that supports 200M bit/sec traffic

throughput at the gateway. As an intrusion-prevention system (IPS), it monitors real-time traffic much like TippingPoint's higherend models — the UnityOne 1200, 2400 and 2000 — that reach gigabit speeds.

The UnityOne 200, aimed at small- or remote-office use, is the first appliance in the TippingPoint line to monitor for peer-to-peer file sharing. Several vendors, including Akonix and WebSense, offer content-filtering products to block peer-to-peer applications at the gateway as concern grows about peer-topeer as a bandwidth hog and possible source of copyright violations.

"Copyright infringement is a concern with the uploading or downloading of video and music files," says Mike Phillips, CIO at Texas Tech University

filtering devices. In addition, new peer-to-peer applications appear continuously and old applications change.

Phillips says he knows that the appliance might not catch every peer-to-peer application on the Internet. He says the Tipping-Point appliance blocks about six of them.

"These services are constantly morphing, so trying to stop 100% of the traffic may be naive and

The Web Security Gateway appliances cost from \$38,000 to \$52,000. They are used to hide details about Web servers and applications through a "Web site cloaking" method, and stopping attacks through anomaly detection and application profiling to block an attempt to manipulate a server in an unexpected way.

Until now, each Web Security Gateway appliance — which typically is deployed behind the firewall - had to be managed by a separate console. The new management console can provide a view of multiple Web Security gateways across the enterprise, according to NetContinuum's Vice President of Marketing Wes Wesson.

The appliance can also push out policies to every Web Security Gateway, or configure each Web Security Gateway to support multiple policies such as one of internal employees and the other for business partners, according to Wesson.

NetContinuum also has added a feature to its Web Security Gateways that will let administrators set up virtual LANs on a per-application basis to force internal traffic back through the gateway for inspection. This feature is intended to quickly detect and stop worm infections that break out inside the network on the corporate LAN, Wesson says.■

Stalker server gets groupware features

BY JOHN FONTANA

Corporate users searching for low-cost alternatives to the major e-mail platforms can look at new groupware features this week in Stalker Software's CommuniGate Pro.

The company is set to release Version 4.1 of its e-mail server, which adds calendars, group scheduling, contacts and a multi-language spellchecker to its list of features supported in a browser interface. The CommuniGate server also supports the full groupware interface of Microsoft's Outlook client.

"We already have the Web mail, and now we are beefing up the interface to make it a groupware client," says Joanne Menapace, product marketing manager for Stalker.

Stalker and other vendors, such as Gordano, Ipswitch, Mirapoint, Rockliffe Systems and Sendmail, offer low-cost alternatives to IBM/Lotus Domino and Microsoft Exchange, which both are beginning major revamps of their platforms. IBM/Lotus is covering both its bases with last month's release of Workplace Messaging, a low-cost e-mail engine that runs on WebSphere and the DB2 database.

"Web browser access means everybody can have e-mail," says Tim Sloane, an analyst with Aberdeen Group. "It's a fast way to reduce costs and achieve ubiquity."

Sloane says Stalker's addition of a more feature-rich Web interface is necessary, but that Web-based e-mail lacks certain features such as disconnected mode, which lets users work on e-mail while offline. Also, he asks, "with a Web interface, how do you begin to integrate other features like presence or voice over IP when you talk about col-

Collaboration is a major topic these days, especially the ability to break collaboration features into components that can be integrated with other applications.

But Stalker is not focusing on that trend.

"We will continue with our model in that what we add to CommuniGate will be on the server. We are not working on the component model," says Ali Liptrot, marketing director for Stalker.

The company's aim now is to entice Microsoft Exchange users to make a switch, especially those on Version 5.5, who must deploy Active Directory before they can upgrade to either Exchange 2000 or 2003, which will ship this fall.

Stalker plans to offer Exchange migration tools before the end of August, according to company officials. The company also will discount its Mail API (MAPI) Connector to support Exchange migrations and continue to support multiple platforms. CommuniGate Pro runs on 30 platforms, including many varieties of Unix, Linux, Macintosh

CommuniGate is priced at \$499 for 50 Web-based users. The MAPI connector, which allows 25 MAPI-client connections to the server, costs \$1,200.



monitor peer-to-peer file-sharing activities.

Health Sciences Center medical school in Lubbock, which has been beta-testing the UnityOne 200. "People in their 20s sometimes don't appreciate the magnitude of what they're doing and that there may be serious consequences to using [peer-to-peer] applications."

Peer-to-peer can be especially hard to trace because the peerto-peer applications often have been designed to be elusive, using techniques such as porthopping to try to fool intrusiondetection systems and contentoverly optimistic," he says.

Texas University Health Sciences also uses the UnityOne 200, which costs about \$25,000, to block attack traffic from the Internet. Tipping Point says it also is adding the peer-to-peer blocking to its other higher-speed IPS appliances.

Meanwhile another intrusionprevention security appliance vendor, NetContinuum, has announced it will enhance its Web Security Gateway line of 100M bit/sec and gigabit-speed appliances.

Low-cost Sun bundles target financial services industry

BY REBECCA REID

Sun has teamed with two software companies to offer financial-information exchange bundles for the financial services community.

The company worked with B2Bits and Financial Fusion to create the FIX products, which Sun says are relatively inexpensive.

FIX is a messaging protocol based on XML that was developed for the financial industry so users could conduct securities transactions in real time. It is commonly deployed in large securities firms that conduct trades, called "sellers", such as Merrill Lynch and The Goldman Sachs Group. But buyers have not adopted it as much, says David Littlewood, director of financial services for Sun.

Sun will pre-install B2Bits' FIXEdge or Financial Fusion's GlobalFix Lite on its Sun Fire LX50 server, running Red Hat Linux on an Intel Pentium III

processor. Users also can buy the software pre-configured to run on Sun's Solaris x86 Platform Edition, the company says.

B2Bits and Financial Fusion are competitors in the

"They compete openly, but for the purposes of this they've actually both worked with us to provide a solution, and the price for both is the same," Littlewood says.

In the near future, Sun also plans to offer the two software packages on its Sun Fire v60x and Sun Fire v65x servers, with either Red Hat Linux or the Solaris

The financial-information bundles cost \$2,500 per month for a three-year lease regardless of configura-

Reid is a correspondent with the IDG News Service's Toronto bureau.





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Tape Disk SAN NAS Servers Software INSIDER Scott Bradner



Reading into the FCC's 'Net access stats

nother year has gone by, and the FCC has issued its annual, almost-useful report on the state of high-speed Internet access deployment in the U.S. Some of the statisticians I used to work with would

love this data because it is so easy to twist to support almost any view, optimistic or pessimistic, about the future of the Internet. Some of the news coverage of this report (www.nwfusion.com, DocFinder: 6432)

called it an FCC report on the "status of broadband access," but the FCC is careful not to use the term "broadband."

Maybe this is because the agency has defined "high-speed" to be 200K bit/sec in at least one direction, which is quite a bit less than most assumptions about what is meant by the term "broadband." The FCC also defines a second term, "advanced services," as at least 200K bit/sec in both directions, which also is slower than what I would call "broadband."

At least one news story was headlined "High-speed 'Net growth slowing." It focused on the fact that the growth rate of subscribers to high-speed Internet access was "only" 23% in the second half of 2002, while it had been 27% during the first half (never mind that an additional 1.3 million people subscribed in the second half, compared with 1.1 million in the first half). The rate of the increase in growth slowed somewhat but the growth rate was still quite impressive.

The FCC uses an easy-to-get — and misuse — measure of the availability of highspeed services. The agency checks to see in what ZIP codes someone is getting highspeed Internet services. The current report says that someone is receiving high-speed service in 88% of the ZIP codes in the U.S. and that 99% of the U.S. population lives in these ZIP codes. But using the provision of high-speed service to at least one subscriber in a ZIP code as a measure of the overall availability presents, at best, an optimistic view of the real world. It would be far more representative to have some minimum threshold of actual subscribers per ZIP code.

What that threshold should be cannot be guessed at from this data because there is no information on what percent of households (or small businesses) receive service in each ZIP code.

I expect the FCC actually has this information but feels it can not provide the data because it would give away too much information about individual providers. (If you look at the tables the FCC provides, you will see that it already blocks a lot of data for this reason.)

Another easy-to-misuse factor in the data is that the commission looks at the speed of the "last few feet" (as the report puts it) when determining if a service is highspeed. But it does not include any measure of actual available bandwidth - with the level of oversubscription that occurs in DSL and cable modem access networks, the final link speed can be meaningless.

All in all, it is better that the FCC provide these stats, even if it would be better if the agency provided more real information.

Disclaimer: Harvard has a department dedicated to the use - or misuse - of stats like this, but I did not ask it for help in the above.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

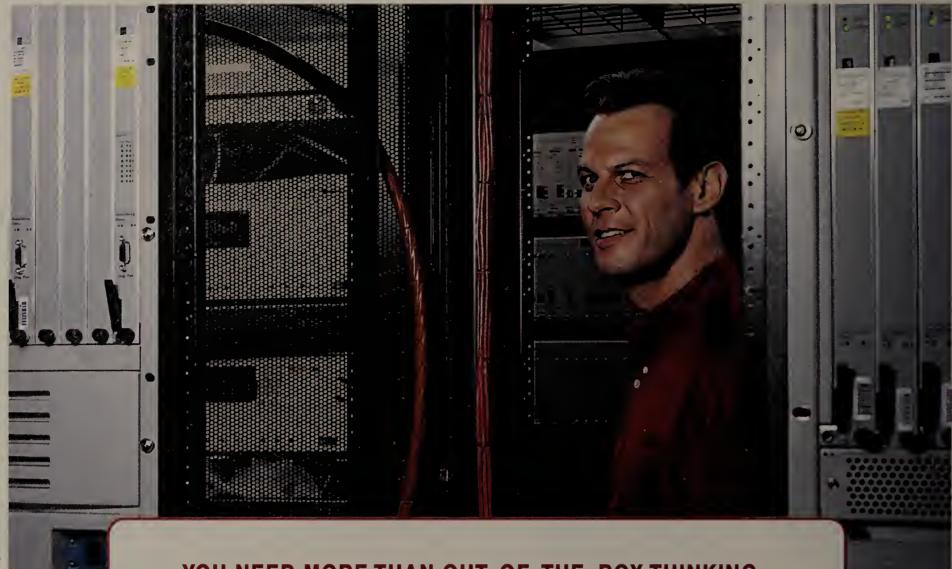






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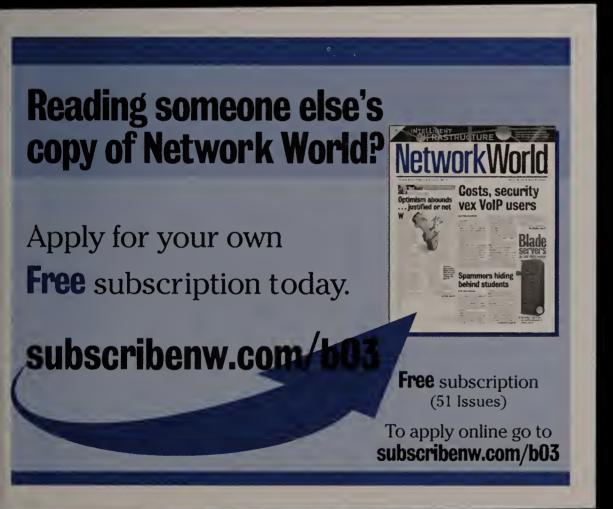
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New Edge touts low-cost frame over DSL

■ BY DENISE PAPPALARDO

New Edge Networks last week announced a national Frame Relay over DSL service that the company says will deliver big cost savings.

The little-known service provider is teaming with Covad Communications to provide the service.

New Edge's Frame Relay over DSL service offers the benefit of a reliable data service at a lower rate than traditional frame, the company says.

"Frame Relay over DSL is about half the price of standard frame service," says Dan Moffat, president and CEO of New Edge. "It lowers the average cost per location as much as 50% to 75%."

Frame relay might be mature "but there are new ways of delivering the service with significant cost savings," he says.

The service will let smaller companies

that need only fractional T-1 bandwidth subscribe to frame relay. As sub-T-1 frame relay rates have increased over the past 12 to 24 months, Frame over DSL also might be attractive to large businesses that have offices with low bandwidth requirements.

"There haven't been as many reliable [data] solutions for small and medium-size businesses," says Rod Woodward, an analyst at Frost & Sullivan. "New Edge is expanding its footprint and offering small businesses a proven technology that's affordable."

The service provider is not the first to offer frame relay over DSL, and it supports some of the largest carriers' frame over DSL offerings, including those of AT&T, MCl and SBC. But until now, New Edge has not offered this service to business users.

New Edge has built its network through acquisitions since it launched in 1999.

Last year the service provider acquired business customers from @Work Networks,

the business services division of @Home, and in October acquired more than 1,000 Cable & Wireless data customers. New Edge made the deal after C&W announced it would serve only U.S. customers that have multinational service needs. Now that the international carrier is leaving the U.S. market completely, New Edge says it is in talks to acquire additional customers.

Although New Edge has acquired a large number of users from national providers, it focuses on offering data services to business users and other carriers in second-tier and third-tier markets. This is why the carrier is teaming with Covad to support its Frame Relay over DSL offer, which provides DSL services mainly in large U.S. cities.

New Edge calls this a national service, although it reaches about 75% of the U.S. But New Edge also offers traditional frame relay services and can reach most areas where DSL is not available.■

New Edge alternative

How Frame Relay over DSL measures up against traditional frame in one hypothetical net (384K bit/sec port with committed information rate of 192K bit/sec**).

| City | Traditional frame/month | FRoDSL/ month |
|--------------------|-------------------------|------------------|
| Green Bay, Wis. | \$840 | \$328 |
| Atlanta | \$764 | \$328 |
| Bethesda, Md. | \$704 | \$328 |
| Dallas | \$701 | \$328 |
| Tucson, Ariz. | \$640 | \$328 |
| Total monthly cost | \$3,649 | \$1,640 |

*Based on ILEC tariffs filed with the FCC.

Vonage tailors VoIP for small firms

Flat-fee dialing includes local, long-distance calls.

■ SBC recently unveiled managed Wi-Fi services for schools and hospitals to let those institutions converge voice and data traffic onto one wireless network. The new services support wireless phones and wireless data connectivity on a single network in the 13 states that SBC services. Previously, SBC's wireless data and voice offerings were provisioned from two separate networks.

■ Verizon recently announced a service that lets small and midsize businesses consolidate data, Internet, local and long-distance services on one circuit. The carrier's Integrated Access offering divides a T-1's 24 channels among voice and data traffic. The T-1 can be customized depending on requirements, and then businesses can reallocate channels as their voice and data needs change, Verizon says. Until now, T-1s had been cost-effective only for large businesses, Verizon says. But with Integrated Access, Verizon offers discounts, rebates and fee waivers.

■ BY TIM GREENE

Vonage, a flat-fee IP phone carrier that has made a lot of noise serving residential customers, now is rolling out bargain bundles of services for small businesses.

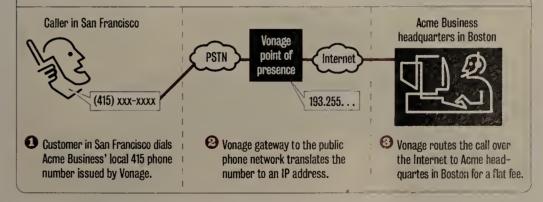
Customer sites with broadband Internet connections can get Small Business Basic service with a 1,500-minute-per-month calling plan in the U.S. and Canada for \$39.95, or Small Business Unlimited plan for \$49.95. A one-line service comes with call waiting, call forwarding, call transfer, voice mail, redial, caller ID, caller-ID blocking and a fax line. Additional phone lines cost \$34.99 per month.

Customers can save money by getting rid of traditional phone lines and using broadband Internet links for phone traffic. A user would plug his regular phone into a Cisco analog telephone adapter that Vonage provided and connect the adapter to a DSL or cable modem connection. It's ready to use once Vonage activates the service. The adapter converts voice traffic to IP and passes it off to the Internet via backbone providers including UUNET and AT&T. Calls can be completed to customers served by IP providers or traditional phone carriers.

Allen Tsong, managing director of handbag-maker Yan's NY, says his company uses

Area-code spoofing

Vonage can give businesses local phone numbers in any city that all call back to a single headquarters, substituting for more expensive toll-free-number services.



Vonage's service for outgoing calls because it costs less than using Verizon. Yan's still uses Verizon for incoming calls to its toll-free number. Tsong plans to install a PC-based PBX between the Verizon and Vonage phone lines and the telephone handsets so employees don't have to worry about picking up the correct phone. The PBX will direct outbound calls from any phone to the Vonage lines.

Because its services are based on IP and Session Initiation Protocol, Vonage can

blend voice with data to create new services. For instance, Vonage's voice mail notifies customers via e-mail when they have a voice message. Those messages can be sent as audio-file attachments. Later this year, Vonage plans to roll out a service that enables voice phone calls from computers using telephony software.

The service has limitations. If the electricity goes out, the service dies unless the customer has a back-up power supply. To

See Vonage, page 34

EYE ON THE GARRIERS Johna Till Johnson



ast week I heard words I never thought would come from the mouth of a telco executive: "We like to provide bandwidth when we can, but we're a managed services provider."

At long last, a faint indication that telcos might be getting the message that it's not about bandwidth, it's about services.

So here's a question: If telcos start positioning themselves as service providers, what does that mean for IT executives? For starters, they need to think about revamping their organizations to better manage their providers. Some recommendations:

• Institute effective best practices for service selection and provider procurement.

How to better manage your service providers

Specifically, institute a formal procurement process.

Start by defining the business needs then moving on to technical requirements. In other words, don't assume the requirement is for frame relay if the business need is really high-speed connectivity to branch offices. Depending on the applications being supported, IP Security or Multi-protocol Label Switching IP VPNs also might be a fit.

Once you've established requirements, define selection criteria for the services. Then take a weighted-scorecard approach to evaluating RFPs, with each selection criterion assigned the appropriate weight that's based on your organization's goals and requirements. This approach not only generally delivers the best solution, it also cuts down immeasurably on the political warfare that often surrounds the procurement process.

• Create and train an effective negotiations team. Most carrier negotiations are handled by the procurement department, with help from the legal team, with the fundamental goal of obtaining the best price. But for services in which terms and conditions might matter more than the price, the negotiations team needs enhancing.

An effective service provider negotiation team should include a technical representative from IT and representation from the business units (who have the best insight on what services are and aren't required). Of course, the procurement folks are still key—they're the people who will succeed in closing the most favorable terms and conditions.

• Establish a vendor management team. Managing suppliers requires a mix of human and project management skills to ensure that the right services are delivered on time. Many IT departments have a lack

of both types of expertise — which means they'll need to recruit talent (either from within or outside the company).

- Appoint internal customer liaisons. These individuals are chartered with ensuring the services that have been negotiated and delivered meet the needs of the business. This means working closely with business units to understand those needs and then communicating them back to IT which is the role of a customer liaison.
- Finally, establish cost and performance benchmarks upfront, and revisit them regularly. This lets you gauge the performance of your service providers, but also gives you important feedback as to your own ability to effectively manage the service provider.

Johnson is president and chief research officer at Nemertes Research, an independent technology research firm. She can be reached at johna@nemertes.com.

Vonage

continued from page 33

get 911 calls to work, customers have to register the physical location of the phone in a database so police and fire departments know where to respond. Traditional phone networks link phone numbers to a particular pair of wires that can't be moved, but the Cisco adapter can be moved to any Internet connection. Also, it is cumbersome to add a second phone line because it

requires stringing together two adapters.

Tsong says Vonage relies on its customers' ISP to deliver a broadband Internet connection, and that means if the ISP has a problem, so does the Vonage service.

For an extra \$4.99 per month, per number, customers can buy extra phone numbers for the same line. So a single Vonage customer phone can receive calls based on a variety of phone numbers with a variety of area codes. This lets people dial local numbers in several different cities and connect

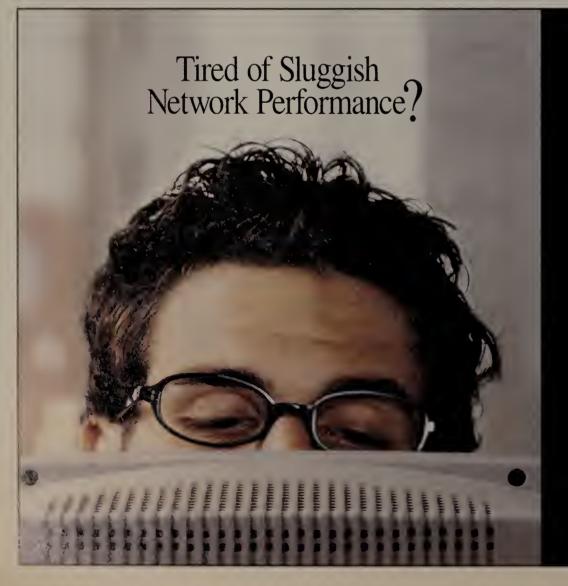
with a single Vonage phone line, similar to toll-free-number service, but less expensive. Even though toll-free service works anywhere, Vonage supports phone numbers in only 137 of about 300 area codes in the U.S.

For Internet connections where bandwidth might be pinched because an ISP is oversubscribing its network, customers can go online to turn on voice compression, shrinking the bandwidth needed for a call to an eighth or less of its uncompressed size. They also can set call-forwarding numbers and activate or deactivate features such as caller-ID blocking.

Vonage says it will add conferencing and auto-attendant services by year-end.

Vonage opened in 2002 and says it has 30,000 customers. Business customers are growing as a percentage of total customers. In March, 5% of customers were businesses and that grew to 7% in May.It is now 10%.

The company offers services in 31 states with firm plans to add six more by early next year.



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ETHERNET: Continues to grow at the ripe old age of 30.

Ethernet: It isn't just for LANs anymore

BY JIM DUFFY

emand for Ethernet equipment and services is expected to grow dramatically in the coming years because of the technology's familiarity, ease of use and technical advancements.

Ethernet has been the dominant LAN transport protocol in corporate networks for almost 30 years. But now carriers are using it to inexpensively build high-performance networks using switches, optical transport gear and installed fiber, to offer services that extend Ethernet from the LAN to the metropolitan-area (MAN) and WAN.

The growth in data services translates into growth for Ethernet equipment and services in the carrier network. SONET networks are optimized for voice and do not inherently provide efficient bandwidth utilization

Moreover, the ubiquity of Ethernet in corporations makes it an especially attractive service as carriers attempt to provide "seamless" connectivity from the company through the MAN and WAN. And Ethernet offers operational simplicity because of decades of

Finally, Ethernet presents a relatively inexpensive alternative to high-speed services provisioned from legacy interfaces. This cost-effectiveness is driving carrier interest in Ethernet now and should continue to do so in the future, research firm Current Analysis says.

In the MAN market, worldwide Ethernet equipment revenue hit \$2.5 billion last year, and is projected to grow to \$5.7 billion by 2006, according to Infonetics Research. Worldwide metropolitan Ethernet equipment ports reached 756,000 in 2002 and will more than quadruple to 3.3 million by 2006, according to the firm.

Compared with SONET, Ethernet will account for a larger portion of carriers' capital expenditures for the MAN, Infonetics predicts. Infonetics co-founder and principal analyst Michael Howard predicts that Ethernet will "take over the metro" in the next 10 years.

As carriers upgrade their backbone networks to 10G bit/sec, they also are looking to support end-to-end Gigabit Ethernet services.

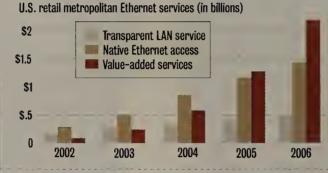
Even with the pressure of decreasing capital expenditures — carriers have cut spending by half or more over the past two years — service providers are investing in metropolitan Ethernet equipment to respond to customer demand or risk losing customers to a competitor, Infonetics says.

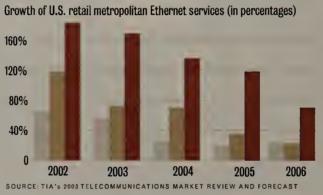
But are Ethernet services really new? Incumbent carriers have offered transparent LAN services (TLS) over Ethernet for years, but these have largely been niche products according to Current Analysis.

It wasn't until the emergence of metropolitan Ethernet

More than transport

As Ethernet pervades the carrier network, value-added services are predicted to drive





providers — such as Cogent Communications, Telseon and Yipes — in the mid- to late-1990s that regional Bell operating companies, incumbent local exchange carriers and interexchange carriers felt compelled to offer Ethernet as a faster and more widely available service. AT&T, BellSouth, Qwest, SBC and Verizon offer Gigabit Ethernet services either throughout or in select areas of their coverage territories.

BellSouth has offered its dedicated Native Mode LAN Interconnection (NMLI) metro TLS service for nine years at 10M bit/sec and then 100M bit/sec. The RBOC pumped NMLI up to 1G bit/sec last year, and it also now supports both shared and dedicated connectivity, says Bob Smith, BellSouth senior director of data transport and connectivity.

"It's the fastest growing enterprise data product for BellSouth," Smith says of NMLI.

Carriers view Gigabit Ethernet service as a natural extension of TLS services they've offered for years, ana-

"It's basically about the same as TLS but with more features underneath," Howard says.

Carriers are now offering virtual LAN (VLAN) capabilities with their TLS offerings, lowering prices and expanding connectivity options beyond SONET, for example via the emerging Resilient Packet Ring standard, Howard says. They plan to take Ethernet beyond simple metropolitan and Internet access connectivity to a provisioning conduit for voice over IP (VoIP), IP VPNs and videoconferencing as IP quality of service and class of service standards are ironed out, according to Current Analysis.

BellSouth plans to offer NMLI as a committed rate ser-

vice of 20M to 500M bit/sec with bursting. The RBOC also plans to add traffic prioritization for VolPIP multicast support, VLAN stacking (so multiple VLANs can share the same circuit), automatic protection switching and service-level agreements, Smith says.

BellSouth also will offer metropolitan Ethernet as an access option to network VPN and dedicated Internet access services, he says.

Carriers are looking to standardize Ethernet offerings. Those participating in the Metro Ethernet Forum are establishing common specifications — and nomenclature — for so-called E-line, or point-to-point Ethernet services, and E-LAN, or multipoint TLS services.

Technology advances also are helping to spread Ethernet throughout the carrier cloud. Until now, Ethernet services have been used primarily for metropolitan-area connections. But as carriers upgrade backbone networks to 10G bit/sec, they also are looking to support end-to-end Gigabit Ethernet services.

Multi-protocol Label Switching (MPLS) also is helping usher in the era of Ethernet service ubiquity. MPLS's Draft Martini, which defines Layer 2 VPN encapsulation over MPLS, is garnering interest among service providers and support among equipment vendors as a way to support Ethernet, legacy frame relay and ATM services over an IP/MPLS backbone.

MPLS also is being evaluated as a way to provide SONET-like resiliency — what some consider the key aspect of being "carrier-class" — to Ethernet. MPLS is the underpinning of an emerging service called Virtual Private LAN Services (VPLS), a point-to-multipoint Ethernet offering that provides connectivity from one site to many, vs. the one site-to-one site limit of point-to-point

"Offering an any-to-any, shared solution is the future of Ethernet services," says Nick Maynard, an analyst at The Yankee Group.

VPLS uses MPLS and its Draft Martini specifications to scale Ethernet by pushing media access control address learning out to the edge of the network, says Ralph Ballart, vice president of broadband at SBC

SBC is readying a VPLS-based TLS service for the second half of this year, Ballart says.

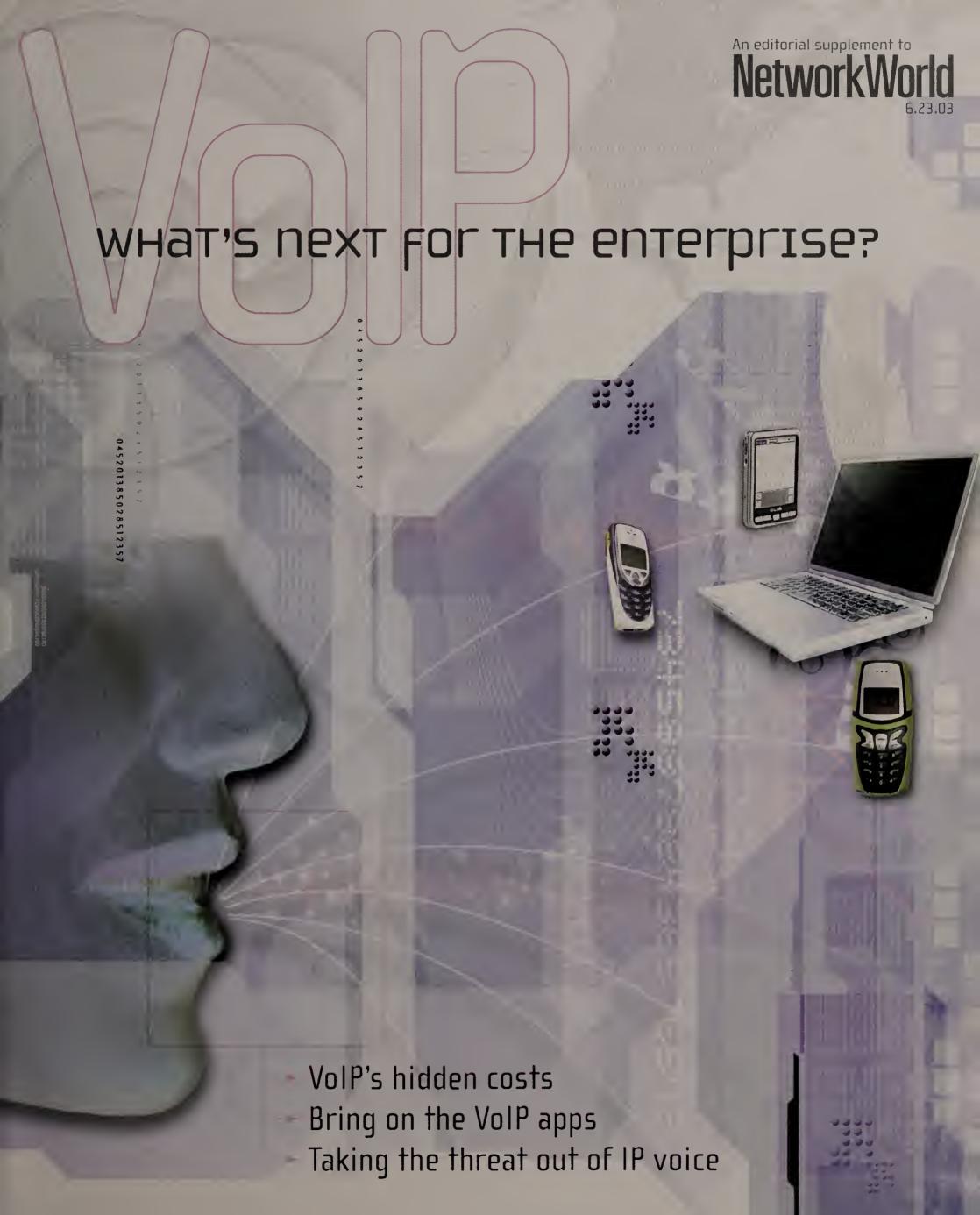
"It's going pretty much as planned," Ballart says. "We were looking for IETF standards on VPLS that scale Ethernet. And management is always an issue."

SBC offers GigaMAN, a point-to-point Ethernet-over-fiber service; and Fast and Gigabit Ethernet on its Multi-Service Optical Network point-to-point and ring-based managed wavelength service.

Masergy Communications, a service provider that operates a global IP/MPLS backbone, recently announced a VPLS service. The company's inControl VPLS offering extends customers' LANs across WANs providing meshed Layer 2 multipoint connectivity.

VPLS lets Masergy divide its network into separate, independent logical switching areas so a customer's VPN is isolated from all other traffic within the Masergy network.

"We're seeing Ethernet move beyond just point-to-point offerings on dedicated facilities," Yankee Group's Maynard says. "All major carriers are in the middle of rolling out the next steps in their portfolios."■







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VolP's Fidential Colonial States of the Colon

Don't let those sneaky project expenses blow your VoIP budget.

6.23.03

BY JULIE BORT

ou've squeezed every bit of efficiency from your IT infrastructure and have started thinking the time might be right for voice over IP and its promised grand benefits.

After all, one physical infrastructure for voice and data is more efficient than dual networks. What vendors don't always mention is that achieving impressive ROI requires budgeting for potentially hidden costs.

VolP implementation costs can range vastly, from \$20 to \$150 per user (with a typical installation being in the \$20-to-\$30 range), vendors say. Of course, larger companies have more negotiating power with vendors to bring their projects in at the lowest per-user costs. Beyond that, if you want your costs to be as low as they can be, you'll need to avoid surprises. That starts with an accurate financial assessment. In addition to the IP PBX and gateways, consider

• A comprehensive traffic study. Users say your VolP project should begin with a comprehensive network and telecom usage-pattern analysis, whether performed in-house or by a consultant. A thorough check of the network with a detailed traffic study is "a beautiful thing," says Kevin Lopez, national manager of telecommunications for accounting services firm Grant Thornton in Chicago. "It will help you know what kind of trunking and bandwidth you need, see what you are going to do and where you are going to do it."

these items for your project budget:

Lopez learned that lesson the hard way. To standardize its voice across multiple offices and ultimately reduce costs, Grant

STEVEN VOTE

Thornton has undergone a multiphase project to upgrade telecom equipment. As part of that project, about 18 months ago it implemented an Avaya VoIP system for sending IP-encased voice over a frame relay network connecting 48 offices nationwide. In November, the company will begin using IP over T-1 lines, and implement quality of service for voice calls.

But Grant Thornton had not performed a comprehensive voice traffic study before implementing the VoIP service. It wasn't until after deploying VoIP that Lopez discovered a large percentage of long-distance calls were between employees. While that was good news — as it meant a 40% reduction in long-distance fees — had Lopez known about that calling-pattern beforehand, he could have provisioned bandwidth differently. He now is reconfiguring some trunks to better handle the traffic flows, he says.

VoIP traffic studies should include analysis of bandwidth usage, availability, calling rates, latency and jitter, says Jorge Blanco, a



vice president for Avaya's converged systems and applications group. Such analysis is typically within the abilities of network staff. But should your staff be too overloaded, your VolP vendor can do it for \$5,000 to \$10,000, Blanco estimates. In-house or not, the budget should reflect expenses incurred in a traffic study.

• Infrastructure upgrades. VolP depends on a state-ofthe-art switched network. If you still use shared links to the desktop and have a closet full of ancient equipment, you're looking at a forklift upgrade. Tying VolP into an overhaul could be wise, as its cost savings can help offset the expense of new gear faster than an upgrade for data applications only.

But even a network that is up to snuff likely will need some infrastructure tweaks. Modest server and router

upgrades were in store for Steve Eager, director of network and systems administration for NFL Films, the filmmaking arm of the National Football League, in Mount Laurel, N.J.



An editorial supplement to Network World

Upon moving into a new building in April 2001, NFL Films converted its nearly 500 phones to a

Cisco VolP system. That meant licensing Cisco's CallManager software and buying Cisco-certified servers to run that software and Cisco routers to handle the traffic uptick VolP would cause. Eager also purchased in-line power blades for the company's Cisco 4006 switches. Inline power supplies electricity to IP phones through Ethernet wiring, so electrical wiring and jacks are unnecessary. All told, Eager says he spent about \$150,000 for network-related upgrades and saved at least \$200,000 in wiring costs. Plus, he avoided buying a new PBX system for the new building, which he estimates would have cost

Consider, too, if you want to run data on your VoIP network regularly or only on an as-needed basis. At Grant Thornton, Lopez retained an existing Cisco router network for data transport. If the Cisco routers go down, we can failsafe over to the Cajun routers. We spent a little bit more money, but have a built-in failsafe," he says.

Such a tactic means higher upfront costs, although it could result in long-term savings compared with a backup plan that has useful equipment sitting idle, waiting for the main gear to fail.

• IP phones. IP phones come in two flavors, hardware handsets and "softphones." Softphones are client-side code hooked up to digital handsets. Prices vary, with an IP handset ranging from \$150 to \$700 — depending on the brand and features — and licenses for softphones running about \$80 per user, for a 50-user pack. Prices for IP hardware handsets are dropping but remain high enough to be of questionable value, even their vendors admit. If you're moving into a new building and can justify the cost with the savings obtained from in-line power — as was the case for NFL Films — they could be a good choice.

Soft IP phones are an attractive, money-saving alternative. OneUnited Bank found the ideal option. It moved to VoIP when consolidating calling plans for its 12 offices that it operates in three states, says Jim Barry, ClO at the Boston firm. The bank ditched its Centrex and voice mail services in favor of Shoreline Communications' Shoreline4 system, including soft IP phones but not IP handsets that would have cost about \$600 apiece. Instead, Barry decided to rely on generic digital handsets." I saved \$60,000 on the phones alone. Do I really need to see a stock-quote stream display on my phone? No," he says of the applications he forwent by skipping the Shoreline IP handsets.

But don't shortchange your VolP users by passing over IP phores altogether, users say." If I had to pick one of my havorite Avaya products it is the IP softphone," Lopez says, aming mobility as the reason. Hard or soft, IP phones let users roam while retaining their phone numbers, internal

extensions and calling configurations (speed dials, transfer/conferencing functions). Softphones are responsible for many of the worker productivity gains commonly associated with VolP.

• Inherent cost of the VoIP system architecture. The cost of maintaining the VolP network depends on the vendor's architectural approach, some researchers find. In a study Shoreline commissioned, The Tolly Group determined that VolP product architectures fall on a continuum, from most complex (and expensive) to least complex (and expensive). "Cisco and Shoreline represent the extremes," says Kevin Tolly, CEO, and a Network World columnist.

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Read about which soft savings will help you make a stronger VolP ROI case.

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Cisco, at the complex end, has what Tolly dubs an "invasive" architecture, where VoIP is an integral part of the data-switching infrastructure."To extend, install, maintain, upgrade your voice infrastructure, you have to perform open-heart surgery on your switching infra-

structure," he quips. This forces VoIP system upgrades into the higher-labor-cost, offpeak hours (although Cisco has products that support real-time maintenance), and it traps users into whatever equipment, pricing and patches the vendor issues.

In contrast, Shoreline treats VoIP more like an application, Tolly says. Or, as OneUnited's Barry describes: "Cisco anticipates a purely Cisco solution. Shoreline anticipates that you'll use its switches, and after that what you use is up to you." Barry offers the generic digital phones he chose as a mixand-match example.

Because OneUnited does not use Cisco data switches, going with a Cisco VolP network would have meant hiring a high-priced Cisco Certified Internetwork Engineer, a cost avoided with Shoreline, Barry says.

On the other hand, NFL Films' Eager, who had a fully trained staff maintaining its Cisco data gear, chose Cisco's VoIP equipment to get single-vendor technical support. This was a soft cost-savings, he says.

Tolly refutes this as much of an advantage, insisting that "VoIP phones and switch ports should be mix and match" without much incompatibility.

In any case, think through the potential of hidden costs in the VolP switch architecture you choose.

• Performance monitoring tools. One final but significant cost comes from performance monitoring, as VoIP will require tools you likely don't own. "Voice is the least forgiving IP application. Any more than a half-second delay makes a voice connection unusable. You need to track not just uptime, but latency," Tolly says, adding that

tools such as Agilent Voice Quality Tester or NetlQ Chariot can cost \$50,000 and for a large WAN with many remote sites, "cost can easily be in the six figures."

You'll have to budget for the major training. Telecom pro-

Costs and the rollout plan

www.nwfusion.com/supp/2003voip/

Budgeting for VolP depends on which offices are upgrades first: headquarters or remote.

Moving to voice over IP requires spending money on IP PBXs and other equipment. But how much to budget even for that depends on your approach to the VoIP rollout.

Two philosophies exist. One is to start small and grow, first outfitting a remote office or two. This is a good strategy for companies that need to purchase new telephone equipment for outlying offices - either to update aging key systems, to standardize a hodgepodge of equipment or when building new remote facilities, says Mike Kirch, a ROI specialist for Cisco.

Initial capital outlay is minimal. Your staff can gain experience with the technology on a small scale, and gather usage, cost and savings statistics before messing with a functioning mission-critical phone system at headquarters. This lets you better understand the needs for the largest offices, thereby maximizing ROI as you slowly bring VoIP to all sites. Savings can help offset the next set of costs.

The second philosophy instead says to do the hubs, then the spokes. You implement VoIP at the main office, and/or the call centers and large regional offices. You then tie in branch offices using smaller, less expensive PBXs, gateways or hubs. This approach offers "the highest return over the life of an enterprise implementation," says Jorge Blanco, a vice president for Avaya's converged systems and applications group.

This plan requires the highest upfront investment but offers several advantages. With the hub done, VoIP is managed centrally from the get-go. Companies engage in the biggest cost-savings for their largest populations of users first.

This is a good method for companies moving their headquarters into new buildings. It is also appropriate for those that have been using outsourced PBX services such as Centrex.

To decide which is right for you, "look for a payback period of less than a year," advises lan Campbell, CEO of Nucleus Research, which specializes in IT ROI research. If you can't get such quick payback periods, he adds, "don't do it." A wireless IP WAN might help with toll bypass, or your long-distance provider will renegotiate lower rates for you, he says. "Think about negotiating before doing your VoIP ROI calculations."

- Julie Bort

tocols such as H.323, Session Initiation Protocol and G711 have steep learning curves and are foreign territory for data guys, Tolly says. Likewise, if you're going to ask your company to put its voice lifeblood in your data network veins, you'll need a method to audit performance. Tolly recommends buying service-level agreement (SLA) monitoring tools, from Packeteer or Sitara Networks. Doing so will require enough funds to place SLA monitoring at every significant remote at roughly \$2,000 per box.

While VolP can have its long-term financial benefits and hearty ROI, calculating the costs is surely the first step.

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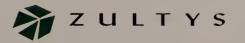


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BRING ON THE VOIP

Four users share how voice-enabling enterprise apps has increased productivity and enhanced customer service.

BY PHIL HOCHMUTH

oice over IP was once marketed purely as a money saver. But increasingly, companies are choosing to build a VoIP infrastructure as much for the applications it will enable as the long-term dollars it could save.

"It is kind of a 'tastes great, less filling' argument, in terms of applications vs. cost savings," says Brian Strachman, an analyst with In-stat/MDR.

While many corporate users still look for ROI from long-term savings in areas such as administration and long-distance charges, Strachman stresses that VoIP-enabled applications are where the real opportunities lie. "The industry can't base its whole future on saving a few bucks. The long-term future of voice over IP is going to be in the applications area," he says.

VoIP vendors are starting to focus on that future. They are pushing to establish application development programs and partnerships for IP telephony, and shifting marketing focus from cost savings to productivity applications. The goal is to make voice an integrated software component in messaging and other enterprise applications. Some vendors promise integration of IP PBXs with back-end business systems, while others are adding functions to IP phones aimed at turning the devices into Java- and XML-based network terminals.

And a handful of enterprise users have started taking advantage of VolP-enabled applications to increase productivity, enhance customer service or otherwise improve their businesses. Here's a look at how four companies are VolP-enabling business applications.

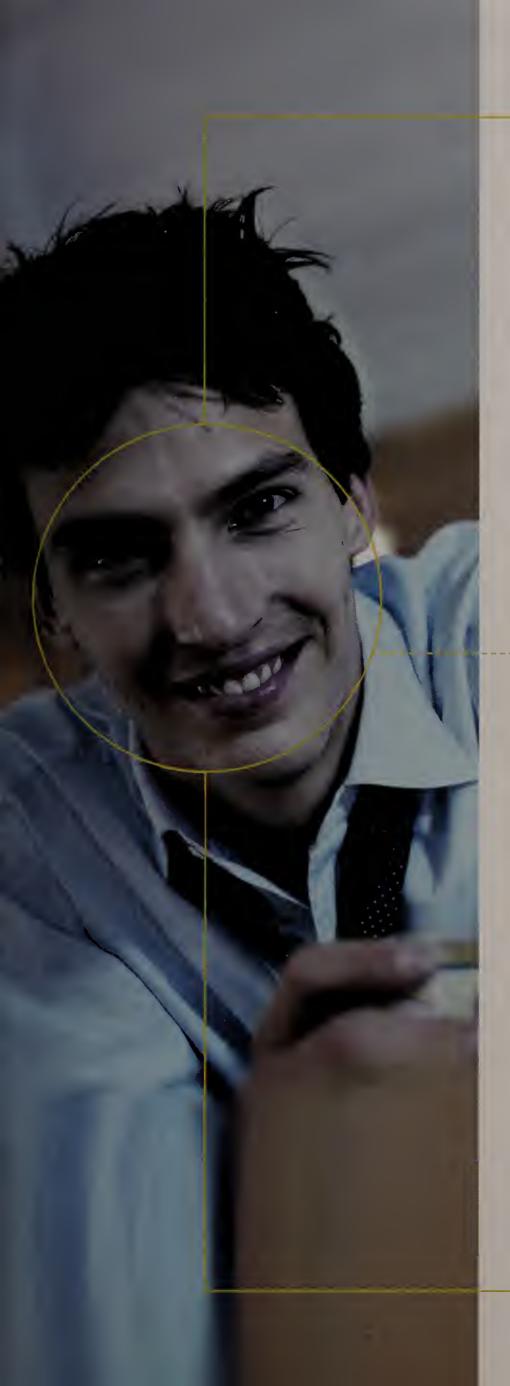
A unified salesforce

Prudential Northwest Properties, a real-estate firm with 20 locations in the Pacific Northwest, says it hopes a VolP-enabled unified messaging application will make its always-on-the-go real-estate agents more assessable and productive. "Unified messaging is very important to us," says Sean McRae, ClO for the Portland, Ore., company. "Our agents are always out in the field, so we had to find technology to help break the chains to the desktop."

For its VoIP infrastructure, Prudential Northwest Properties uses 3Com's NBX IP PBXs, IP phones, CommWorks VoIP Gateway and its carrier-class CommWorks Softswitch

See Apps, page S8







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continued from page S6

with Unified Communications software. The CommWorks Softswitch, which runs on redundant Sun Solaris servers, is located at a central site, while the NBXs, VolP gateways and IP phones operate in the larger branch offices. NBXs in the branches tie into the centralized CommWorks Softswitch, via the gateways, as a single phone system with one database for management, administration and system configuration. Smaller offices, those with five to 10 agents, get the 3Com phones and CommWorks VolP Gateways, but not the NBXs. The central CommWorks Softswitch provides the call control, features and public network connectivity for those offices.

The Unified software, which supports the IETF's Session Initiation Protocol (SIP) for real-time communications, ties together voice mail, fax and e-mail systems. From Microsoft Outlook e-mail clients, Prudential Northwest Properties' 700 agents can get voice and fax messages. Or the agents can get e-mail while on the road by calling into the system. A text-to-speech server application reads the messages to them. While all offices are not yet on the IP telephony system, every agent has access to the Unified applications.

"The [Unified] software gives our agents the ability to sit down in a Starbucks [with Wi-Fi hot spot service] and wirelessly, from a single application, pull up all the paperwork for any transaction — all the e-mails, forms and faxes are right there," McRae says.

He adds that coffee shops have become a favorite place among Prudential Northwest Properties agents for conducting business. The payoff has been huge, McRae says. "We did an analysis and found that our Unified Communications users were saving about 20 minutes a day by more efficiently handling their messages. Having 700 agents doing their job more efficiently every day, 52 weeks a year — that's the value proposition right there," he says.

VoIP chemistry

Bill Copple, director for a massive VolP project at Dow Chemical in Midland, Mich., agrees about the value proposition of VolP-enabling unified messaging. Dow is deploying unified messaging to more than 50,000 employees as part of the company's DowNET project, launched in 2001 with the help of Electronic Data Systems. The goal of DowNET, which is due to be completed by yearend, is to get every Dow employee on a unified voice, messaging and video system based on Cisco's Architecture for Voice, Video and Integrated Data equipment. (See related story, right, for Dow's approach to IP video.)

Dow is deploying hundreds of Cisco CallManager IP PBXs and thousands of Cisco IP phones at facilities in 35 countries, with the whole system connected across Dow's global private IP WAN. Cisco Unity unified messaging servers provide voice, fax and e-mail access via one Microsoft Outlook in-box.

Rolling out VolP-enabled applications can be challenging, especially when it comes to as sizable a deployment as Dow's. The company has encountered problems ranging from end-user training to technology migration at sites around the globe, Copple says.

With all the new features brought by IP telephony and unified messaging, the technology comes with a learning curve, he notes. "Employees had to relearn new commands and phone capabilities. While we had a good training program, it was not initially hands-on early enough in the process; this has been corrected," he says.

Dow's IT staff also has evolved with DowNET."Another challenge was the level of variability in the network and n essaging infrastructure across Dow sites globally, Copple says. "We underestimated how important this was from one site to the next. One of Dow's IT principles is to implement standard solutions across the enterprise. Our

initial approach was to uplift all the technology within a site and then go to the next site. While this implementation approach has been successful in the past ... we found that with DowNET we needed a more layered strategy."

Over the past year, Dow has changed its strategy by upgrading LAN and WAN infrastructures for supporting voice, followed by unified messaging, with IP telephony being the last stage of a site deploy-

VoIP-based room service

While Dow grapples with VolP-enabled unified messaging, a new Boston hotel is counting on VolP to help it provide top-rate customer service. The Hotel Commonwealth in Boston's Back Bay neighborhood offers its guests a laundry list of high-end amenities, including down-filled pillows and comforters, 70 cable TV channels and in-room DVD players — not to mention SIP-based, Java-enabled IP phones that offer a

To provide premier service, the month-old hotel uses an integrated system of customer relationship, ordering and billing software on the back end, with Pingtel IP screen phones as guest portals in the hotel rooms. The phones run on a converged voice and data network built with Alcatel's SIP-based OmniPCX Enterprise IP PBX at the core. A guest can order a meal, rent complementary DVD movies from a nearby Blockbuster or browse a list of other hotel services from the phone's PDA-sized touch screen.

"The screen phones are a less-intrusive way of letting guests know what services the hotel has to offer," says Stewart Randall, principal consultant at Communicates Design Associates, an IT services firm that helped design and install the VolP infrastructure. Randall says the hotel wanted to avoid standard guest information systems, such as TV channels that come up when the TV is turned on and continually broadcast hotel services. "Our system is like sending instant messages to guests without bothering them," he says.

For hotel personnel, the phones act as Javabased clients for an internal Web-based directory server used to push out content. The hotel staff keeps offerings fresh using simple tools for creating and formatting content for the phones.

Of course, guests can talk on the phones, too. Randall says the voice quality on the network is as good as any hotel phone system and that many telephony features such as voice mail, multiple lines and speakerphones are available to guests. For frequent visitors or long-term guests, the system can remember

and save individual phone numbers so people keep the same number even if they move from room to room. The value of the phones lies in their versatility, Randall adds.

Billable hours with VolP

For Manhattan law firm Hahn & Hessen LLP, a VolPenabled billing application has more than proven its worth, says Nicholas Lucenko, IT manager at the firm.

"Our whole business is based on billable time with clients, and a lot of that time is spent on the phone," Lucenko points out. In the past, the firm maintained separate phone and accounting systems, with client billing handled the old-fashioned way — in paper diaries. "Billing was kind of a tedious chore for the attorneys," he says. And at the end of the month, when attorneys had to enter their diaries into the accounting system, "utilization on our systems went through the roof," he says.

But when Hahn & Hessen moved its offices out of the

IP video: The other VolP

www.nwfusion.com/supp/2003voip/

Dow Chemical layers video into a massive voiceover-IP deployment project.

Sometimes referred to as "the other VoIP," IP video has been used longer than IP telephony in some companies, but it has been viewed as more of a bell-and-whistle technology than a core everyday business tool, such as phones and PCs.

While rolling out IP telephony across its global network, Dow Chemical saw the opportunity to layer video onto the system and make it a more practical application for users.

Dow has established iRooms, or conference rooms wired for IP videoconferencing, in 30 facilities in the U.S. and overseas. These rooms are equipped with Cisco IP voice and videoconferencing equipment, including IP-based multipoint control units, and PCs for operating Cisco's IP videoconferencing software. The DowNET videoconferencing tools also tie into Microsoft Exchange scheduling servers, which notify users of scheduled videoconferences.

"Before DowNET, it took weeks to schedule and coordinate a [videoconferencing] meeting activity, and the quality was not always up to Dow's standards," says Bill Copple, DowNET program director at Dow in Midland, Mich. The difficulty was a result of the ISDN-based videoconferencing equipment and services Dow used in the past from multiple providers. This produced mixed-quality results and was expensive: "In many instances, employees preferred face-to-face meetings," he says.

Now, scheduling video time is as easy as setting up a bridge to talk to employees in different offices, Copple says. The fact that video runs over IP, along with voice and data, means that the service is included in the cost of regular network maintenance. Video also has helped reduce travel expenses.

"Travel restrictions brought on by challenging economic conditions [has] limited our employees' ability to meet face-to-face," Copple says. "The iRooms address this, and the results are very impressive."

Videoconferencing has increased seven times since the same time last year, he adds. And over the next year, Dow will roll out desktop video cameras as part of DowNET, letting some employees, such as engineers or researchers, initiate their own one-on-one or group video calls.

- Phil Hochmuth

Empire State Building to a more low-profile and hightech facility on Madison Avenue last year, the firm ditched its old NEC PBX and voice mail system for Cisco's CallManager IP PBX, Unity messaging servers and phones, operating on a Fast and Gigabit Ethernet LAN from the vendor.

Now the firm tracks call usage and bills daily through CallManager. It can pull call records to determine exactly how long a billable client/attorney session lasted by matching the attorney's network ID to the phone number called and the amount of time spent on the call. An automated back-end application — which IT integration firm Greenwich Technology Partners helped develop and integrate — imports this data into the billing system.

"This is the type of architecture that sold us on VoIP," Lucenko says. "It's the kind of system that we can build upon with applications that streamline our operations, and give cost-recovery opportunities."

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TAKING THE HANDE AT LONG THE H

password

IP voice needn't be more of a security risk than data applications, as long as you take a few simple precautions.

nce corporate users have tested voice over IP and proven that it works, they face one last hurdle: making sure it's secure.

But users who have taken the plunge into VoIP say they're not worried about security. "If you configure it properly and treat it as you would any other mission-critical server and application on the network, voice over IP is as secure as any other data," says Doug Haluza, director of engineering and new technologies at Lexent, a New York electrical services firm that has run VoIP on its corporate network since January 2002.

Analysts agree, saying that safeguarding VoIP comes down to typical procedures for ensuring the security of networked servers, applications and voice. But, special care is required when choosing firewalls, intrusion-detection systems (IDS) and other security tools.

Firewalls are tricky

BY JOANNE CUMMINGS

Securing VoIP data at the firewall is tricky. VoIP sessions use H.323 or Session Initiation Protocol (SIP). Firewalls in a VoIP deployment must be able to handle these fairly complex real-time communications protocols. H.323 and SIP have separate control and media transfer connections, which means they typically make a connection on one IP port to set up a call and then pick a random, high-numbered IP port, usually above Port 1024, for the data connection. You can't simply configure a firewall with certain ports opened and blocked because the device can never know which port will be used for the connection.

"You need a firewall that understands those protocols well enough to only open data connections when they've been negotiated and authenticated in the control fields," says Mark Kraynak, strategic marketing manager at Check Point, which markets stateful SIP- and H.323-compliant firewalls. "And it needs to know to close them when [the sessions are] over."

The firewall also has to do all of this stateful packet inspection without affecting the performance of the voice stream.

Based on International Telecommunication Union recommendations, the voice stream should be subject to no more than 100 millisec of delay end to end. Because voice uses smaller packets than data and transmits more packets per second (about 50 packet/sec per voice stream, nearly twice the number of packets in a typical data stream), processing voice can quickly bog down a firewall.

"A lot of software firewalls can meet the demands of data traffic, but when you start to initiate 50 packets per second per call, that really ups the amount of packets they have to inspect and some can't keep up," says John Truetken, senior architect for MCl

Advantage, a converged IP service for enterprise users. He says dedicated hardware firewalls tend to perform better.

The same is true of VPNs, he says. "Some low-end VPN encryptors have a problem when you get up to 20 or so voice streams," he says. "The number of packets per second they have to deal with sometimes can overwhelm them."

That's a problem Lexent's Haluza experienced firsthand. The company had implemented an IP Security (IPSec)-based VPN among various sites before deciding to run VoIP over it.

"Initially, we had built up the network with routers at the remote sites and terminated the IPSec tunnels on the firewall at headquarters. We quickly found out that was a dead-end decision for VoIP," he says. The Cisco PIX firewalls Lexent uses don't have hardware accelerators, only software encryption. "That's no good for voice because there's too much jitter," Haluza says, noting that callers experienced voice dropouts whenever the processor on the firewall became busy.

"The other thing we found out is that we couldn't place calls from remote site to remote site because the firewall wouldn't let the packets in and out through the same port," he says. Lexent got around both problems by terminating the IPSec tunnels on routers at both ends, because the routers had hardware acceleration and could route between the sites. "That way, we get the encryption with high performance," he says.

Safeguarding the server

The VoIP server needs special attention, too. The operating system of most IP PBXs must be stripped of unnecessary services that can lead to security breaches.

"The server should be dedicated to voice serving," says James Coffman, director of architecture and planning for Avaya. Describing Avaya's MultiVantage IP PBX, which runs on a stripped-down version of Linux, he says: "There's no Web browser, no mail reader, no finger daemon. We disable a lot of standard network capabilities that you get on a server out of the box."

Such operating system hardening helps keep the platform safe from viruses and worms, such as the recent Slapper and Nimda exploits. "Some IP telephony core servers were just running plain

See Threat, page \$14



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Threat continued from page S10

vanilla Windows NT software, and they got hit by Nimda," says Fred Weiler, director of security solutions marketing at Nortel. "Our platforms are based on embedded NT that's hardened, tested and stripped of unused services, and none of our IP telephony platforms got hit."

All of which points a finger at Cisco, which had some of its NT-based CallManager VolP servers taking Nimda hits (see www.nwfusion.com, DocFinder: 6421). Cisco quickly issued patches for the systems and also has progressively hardened its platform. The company plans to offer non-NT platform choices by year-end, although it says that if users are diligent about following best practices with vulnerability assessments and patch management, the VolP server will be no more vulnerable than any other on the network.

Many users dismiss IP PBXs based on Windows, citing security reasons. "When we look at major applications, we take into account whether their platforms attract more viruses or hackers, and I think that Windows is by far the biggest target," says Brian Young, ClO at Hobart and William Smith Colleges in Geneva, N.Y., which is running VoIP on one internal test LAN. "We need to do more for less, and that means having a system that's stable and doesn't take a lot of added security and features to protect it and run it. So for now, we're focusing on Linux and Unix platforms for voice over IP."

But Lexent's Haluza contends the Windows vs. Linux/ Unix argument is basically religious. "We pick the best tool, no matter the platform," he says.

Still, he takes precautions, chiefly not exposing his

voice server to the Internet. It has a private IP address, and voice traffic travels only on the secure LAN under the VPN, he says. Instead of sending VolP traffic over the Internet, Lexent buys voice links from a single carrier to handle traffic beyond the LAN.

"From our company out, we use traditional ISDN [Primary Rate Interface] voice circuits, but we terminate the PRI circuit from the carrier on the router, and then it's IP on our LAN side," Haluza says.

Some start-ups are beginning to address the Internet security issue, primarily through firewall technology (see story, below).

A voice-specific IDS can provide more VoIP server protection, yet users say such devices aren't ready for deployment yet." I won't bring VolP into production at the school until we have some kind of voice-specific IDS in place, and we haven't seen that many so far," Hobart and William Smith's Young says.

MCI's Truetken explains that most IDSs are hamstrung by their propensity for false alarms, a factor that might inhibit their performance, especially in a voice environment. "You'd have to set their thresholds higher to accommodate the higher number of packets for voice," he says. "Otherwise, you'll just have limitless false positives."

Cisco says it has solved this problem through technology gained in two recent acquisitions. From Psionic, it gained the ability to automate alarm investigation, and from Okena, intrusion prevention and detection.

Eavesdropping is overblown

Another consideration is securing the application so that a hacker can't eavesdrop on a voice call or hijack voice service. One way to avoid eavesdropping is to

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[773] 283-0213; Fax: [773] 283-0214 Executive editor: Julie 8ort (970) 468-2864; Fax: (970) 468-2348 Art direction: Jacy Edelman Network World art director: Tom

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Managing editor, Fusion: Helissa Shaw Online graphic designer: Zach Sullivan Copy editor: Ryan Francis Network World editorial director: John Network World editor In chief: John Oix Cover and inside illustrations: Sara Haywart

encrypt the call, which current VPN technology easily handles. However, be sure that the end device has the processing power to support a VPN client. Many IP phones don't have that power, Avaya's Coffman notes.

In such cases, a user would implement a VPN client on a workstation or laptop and connect the phone to the PC. "That works, but you need to ensure that the laptop doesn't interfere with the VoIP call,"Truetken says. "If it's running XP, you're probably fine. But if it's Windows 98, you can run into problems. For example, DSL has 256K bits per second of bandwidth, which is fine to support a voice call. But if you're running Outlook at the same time, you can run out of processing power."

Others question the necessity of encrypting VolP over the LAN at ail. "The need to encrypt here is not that huge," Young says. "Just look at how many people use cell phones today, and they're far easier to capture and listen in on than a VolP voice stream. It's not a priority."

Lexent's Haluza agrees."I'm more worried about people getting into back-office applications than VoIP," he says. "It's a case of overblown risk."

Cummings is a freelance writer in North Andover, Mass. She can be reached at jocummings@attbi.com.

Securing VoIP on the Internet

Two start-ups take aim at securing IP voice outside the corporate firewall.

Most corporate VoIP users are focused on running voice over secure intranets, usually via a VPN. VoIP on the Internet is often viewed as difficult or risky.

"We didn't even try to do IP voice outside our cor-

porate network," says Doug Haluza, director of engineering and new technology at Lexent, an electrical services firm in New York. "There are just too many security hassles associated with opening the network up to the Internet, and with longdistance costing just 5 cents a

minute, there's no ROI worth the hassles."

True, VoIP over the Internet is riskier, says Steven Taylor, president of Distributed Network Architects, but, he adds: "The bad news about staying off the Internet, though, is you don't have connectivity to everyone in the world. It's definitely a trade-off

A couple of start-ups, Ridgeway Systems and Kagoor Networks, are offering security tools designed to secure Internet VolP traffic.

Ridgeway offers the IPFreedom products for letting voice streams traverse multiple firewalls securely with little to no performance degradation.

Firewalls pose problems for VoIP packets crossing nonassociated networks, such as those between business partners, unless partners use the same firewall, configured exactly the same. A partner's firewall might view a VoIP call as unsolicited traffic and block It. Or, if a company is using network address translation (NAT) — internal private IP addresses — dispancies between packets' internal and header addresses can occur, causing packets to be dropped. With IPFreedom, business partners install client

software that communicates with the Ridgeway server. The server software does the necessary address translations, and because the clients and servers have an established TCP session, their call notifica-

More online! See a network diagram of how Lexent has implemented voice over IP.

DocFinder: 6234

tions can get through the firewalls without being blocked. Once a call is in progress, the equipment uses just two firewall ports to shuttle traffic through, ensuring security.

Ridgeway says corporate VoIP customers typically pay \$125 per IPFreedom client, but volume discounts are available.

Kagoor provides similar capabilities through its VoiceFlow series of products. Kagoor is targeting service provider networks, with the idea that carriers could use the Kagoor software to offer similar firewall traversal and NAT services to corporate customers.

— Joanne Cummings

"There are just too many security hassles associated with opening the network up to the Internet, and with long-distance costing just 5 cents a minute, there's no ROI worth the hassles."

- Doug Haluza, director of engineering and new technology, Lexent



EASILY DELIVER APPLICATIONS TO THE SCREENS OF IP TELEPHONES...TODAY



Across enterprises, college campuses, in hospitals, retail establishments, manufacturing plants and financial institutions, IT organizations are being asked to make information available to a growing list of users without being given the budget for additional computers or application development resources.

As enterprises continue to deploy IP Telephony systems, one of their biggest challenges remains the cost, time and effort associated with delivering applications that take full advantage of the

large screens, browsers, high-speed connections, and speakers that are available on IP telephones.

The most affordable, expedient answer to these issues is to extend business applications currently restricted for use on PCs and laptops by transforming them into a format suitable for interaction on the screens of IP telephones, regardless of the manufacturer.

"We have seen a real customer need for applications delivered to the display of IP telephones," said Christin Flynn, Director, Communications Network Infrastructure with the Yankee Group. "The Net6 Transformation Gateway (TG) is the first product on the market focused exclusively on enabling organizations to easily transform existing applications for interaction with any IP screen telephone—whether from Avaya, Cisco, Mitel, NEC, Nortel Networks or Siemens."

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The Net6 Design Studio is the intuitive "point-and-click" development tool that enables an administrator to rapidly customize applications for use on any IP screen telephone.

APPS ON IP TELEPHONE SCREENS IN 3 EASY STEPS

specific device.

In Net6 Design Studio (a simple, point-and-click graphical user interface), simply open the desired application.

Point and click on the desired portions of the application within Net6 Design Studio to define transformation rules that customize the application user interface for the

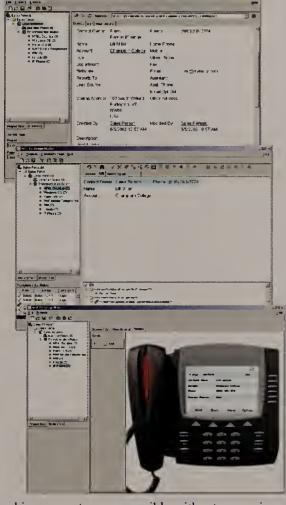
Use the integrated IP telephone simulator within Net6 Design Studio to layout how the application will appear on the IP telephone display. This gives you the ability to view, simulate and revise the information

Once the transformation rules are complete, they are saved on the Net6 TG where they immediately transform requests in real time from IP telephones that are accessing the applications. The outcome is an optimized user experience on any IP telephone, regardless of variations

in screen size, resolution, memory or graphics support—now possible without expensive and time-consuming software development or major changes in the source application.

Net6 TG is also designed to deliver applications for use on wireless devices, such as Pocket PC or Palm PDAs, RIM pagers or web-enabled cellular telephones. Once transformed for IP telephones, an application can easily be accessed by wireless devices... across all networks, including 802.11, WiFi, CDMA 1X-RTT or GPRS.

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Law firm dumps BlackBerry for Good Good Technology's Good Link server provides real-time message synchronization without a cradle.

BY TONI KISTNER

Keesal, Young & Logan is a relatively small law firm, with 80 lawyers in five offices on the West Coast; in Anchorage, Alaska; and in Hong Kong. But when it comes to technology, the firm is a powerhouse. Its recently completed Web portal — four years in the making — lets attorneys access 95% of their applications remotely, making the firm's VPN and remote-access server obsolete. Keesal's mobile strategy is no less progressive.

The firm's director of information, Jason Hectus, ran the portal project, which involved custom-building an array of Web applications using Active Server Pages, XML and Simple Object Access Protocol. When it was time to upgrade attorneys' workstations two years ago, Hectus and his team wanted mobile devices that best took advantage of the portal. They launched a pilot with laptops, but quickly

realized they were a poor fit. The upfront and support costs were too high, especially when lawyers would use them only to check e-mail. Hectus had followed the mobile marketplace for a long time, but wasn't happy with what was available. Although Research in Motion's BlackBerry provides the enterprise connectivity Hectus wanted, he wanted a mobile device that wasn't tethered to the desktop, one that provided continuous synching with Outlook, was comfortable and was natural to use. As a result, he hesitated — so long the attorneys began buying Palm Pilots, Treos and Pocket PCs.

"Finally, we just pinched our noses and went with BlackBerry," he says. The firm bought the BlackBerry Enterprise Server and 20 devices, and used the product for

As Hectus expected, there were problems. "Our road warriors who would have their BlackBerries in one state, their Outlook in another state, and log onto Web Outlook, and it would confuse them," he says.

BlackBerry devices are linked closely to the users' workstation. They require a cradle for desktop synching (although the new 6210 replaces the cradle with a USB cable) and client software, all of which translated into additional support and an occasional a trip to Anchorage for one of Hectus' network engineers to "adjust a cradle." Users also complained of 10- to 30-minute mes-

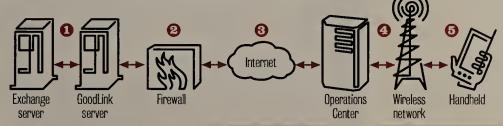
"It really fell short of our goals," he says.

But six months ago, Hectus learned about start-up Good Technology from his systems integrator, who was a RIM reseller. Good's GoodLink Wireless Corporate Messaging System works with Microsoft Exchange to provide continuous, real-time synchronization between the user's Exchange mailbox and the device. Messages are sent to the user's Outlook client and Good device simultaneously: When you open a message on the device it appears as opened or read on the client, too — no cradle, no synching. There's also the ability to view and forward attachments, resolve calendar conflicts in real time, and erase data remotely in case of theft. Moreover, multiple Exchange servers on a LAN require only one Good-Link Server. The service runs on the Cingular Mobitex wireless network.

GoodLink runs on Good's own device, the G100, and on BlackBerry devices making it a formidable competitor to RIM's

GoodLink Wireless Corporate Messaging Sysem

HOW IT WORKS Good Technology's proprietary system ensures e-mail is always synched in real time between the server and the handheld. Special compression techniques keep message size to a minimum.



Exchange continually communicate using the MAPI protocol. GoodLink monitors change logs and accesses mailboxes.

receives new messages, it compresses and Triple-DES encrypts them before sending them through the

transmitted via HTTP over SSL to the GoodLink Operations Center:

es to the appropriate handheld connected to the wireless network. GoodLink's Positive Acknowledgement Architecture ensures messages are transported reliably between the GoodLink Server, the center and the device.

1 The GoodLink Server 2 When the server 3 Messages are 4 The Operations Center routes 5 When the wireless handheld receives the message, it uses a key shared with the server to decrypt and decompress the message. When a user sends a message from the handheld, the process happens in reverse.

BlackBerry Enterprise Server. Good launched a year ago, and in the last six months, it has doubled its customer base to 750. Forty-five percent come from the legal industry, which was long a RIM stronghold.

RIM has responded by launching several patent-infringement suits against Good. According to reports, RIM has accused the company of misappropriating its trade secrets and inducing RIM customers to replace BlackBerry software with Good software on their handhelds, in violation of their RIM software agreements. Most recently in April, a Superior Court judge in California denied RIM's request for a preliminary injunction against Good.

The pending litigation prompted Hectus to buy BlackBerry devices over Good's G100s, as a way to protect his investment should Good lose the suits and consequently fold. Even so, Hectus quickly went from 20 devices to outfitting all 80 lawyers with BlackBerries running GoodLink. He says Good gave his firm the GoodLink server software for free.

Danny Shrader, Good's CEO, says his company makes it very easy for corporations to migrate from RIM to Good. In the coming months, Shrader says GoodLink will run on next-generation voice and data Palm Pilots and Pocket PCs, and run on several wireless networks. Good recently shuttered its hardware business, and this month partnered with Dell to sell its Axiom PocketPC devices and servers running GoodLink.

According to RIM, wireless reconciliation

has always been on its road map."The company says the new version of BlackBerry Enterprise Server bidirectionally "reconciles" deletions, messages, moved folders, automatically every 10 to 15 minutes, and lets users force a reconciliation on command. Although the new version improves wireless synching with Outlook, Hectus says that it wasn't what he wanted. He says with GoodLink, support calls are nonexistent — except for the time a lawyer ran over his device with a golf cart.

Keesal also is taking advantage of Good-Info, Good's development environment, to build applications for tasks such as expense reporting and time tracking. Lawyers download the applications from the portal, or they are sent directly to the devices as email attachments. Clicking on the attachment icon initiates the installation.

"It's like something out of the future," Hectus says. "And because we're so focused on Web apps, it's a natural progression to go to tiny little XML applets that sit on a device, talk to our Web services and return the info the lawyer is looking for."

GoodLink makes his attorneys feel like superstars, Hectus says. "A third-year associate was taking a deposition from a much larger firm when their attorney pulls out his BlackBerry, she her GoodLink, and they compare notes. He says, 'What's going to be really cool is some day we can enter our time from the device. She says, it is really cool; I can do it now. When she got back to the office, she was doing cartwheels."

■ Belkin, Buffalo Technology, Linksys, Netgear and SMC an-

nounced firmware upgrades to the recently finalized 802.11g specification. The firmware can be downloaded from their sites. Others are expected to follow suit. D-Link and SMC both say their products are compliant.

■ The U.S. Office of Personnel

Management recently released a new telework guide. "Telework: A Management Priority: A Guide for Telework Managers, Supervisors and Telework Coordinators" covers all the bases, and provides additional resources such as a telework assessment tool, surveys, a FAQ and sample telework agreement. Confirming the government's commitment to telework, OPM director Kay Cole James said in the guide's opening letter: Telework allows the Federal government to remain responsive to the nation at all times." (See www. nwfusion.com, DocFinder: 6434.)









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NetworkWorld 55

HILLIUM TECHNOLOGIES AND STANDARDS

802.11e brings QoS to WLANs

BY JEFF THOMAS

As users experience the convenience of wireless connectivity they are beginning to demand support for the same applications they run over today's wired networks. Because wireless bandwidth availability is restricted, quality of service is increasingly important in 802.11 networks.

Enter 802.11e, a proposed IEEE standard to define QoS mechanisms for wireless gear that gives support to bandwidth-sensitive applications such as voice and video.

The original 802.11 media access control protocol was designed with two modes of communication for wireless stations. The first, Distributed Coordination Function (DCF), is based on Carrier Sense Multiple Access with Collision Avoidance (CSMA/ CA), sometimes referred to as "listen before talk." A station waits for a quiet period on the network and begins to transmit data and detect collisions. DCF provides coordination, but it doesn't support any type of priority access of the wireless medium.

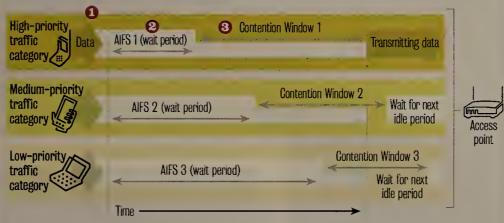
An optional second mode, Point Coordination Function (PCF), supports time-sensitive traffic flows. Wireless access points periodically send beacon frames to communicate network identification and management parameters specific to the wireless network. Between the sending of beacon frames, PCF splits the time into a contention-free period and a contention period. With PCF enabled, a station can transmit data during contention-free polling periods. However, PCF hasn't been implemented widely because the technology's transmission times are unpredictable.

Because DCF and PCF do not differentiate between traffic types or sources, the IEEE is proposing enhancements in

HOW IT WORKS

802.11e

802.11e is a proposed standard for quality of service in wireless networks. Enhanced Distribution Coordination Function has multiple traffic categories for prioritization.



- 4 A phone, PDA and PC with traffic categories of high, medium and low all have data to send on the wireless network. After the phone finishes sending a packet, the access point acknowledges
- 2 After the acknowledgement, there is a wait period called the Arbitration Interfame Space (AIFS) before stations attempt to send data. This is based on traffic category priority. For traffic categories with higher priority, the wait period is shorter than for those with lower priority.
- 3 The phone selects a random number at the beginning of its contention window and begins to count down. The other stations do the same as they wait to access the wireless network, but suspend the countdown once the phone begins to transmit a packet.

802.11e to both coordination modes to facilitate QoS. These changes would let critical service requirements be fulfilled while maintaining backward-compatibility with current 802.11 standards.

The proposed enhancement to DCF — Enhanced Distribution Coordination Function (EDCF) — introduces the concept of traffic categories. Each station has eight traffic categories, or priority levels. Using EDCF, stations try to send data after detecting the medium is idle and after waiting a period of time defined by the corresponding traffic category called the Arbitration Interframe Space (AIFS). A higher-priority traffic category will have a shorter AIFS than a lower-priority traffic category. Thus stations with lower-priority traffic must wait longer than those with high-priority traffic before trying to access the medium.

To avoid collisions within a traffic category, the station counts down an additional random number of time slots, known as a contention window, before attempting to transmit data. If another station transmits before the countdown has ended, the station waits for the next idle period, after which it continues the countdown where

No guarantees of service are provided, but EDCF establishes a probabilistic priority mechanism to allocate bandwidth based on traffic categories.

Another way 802.11e aims to extend the polling mechanism of PCF is with the Hybrid Coordination Function (HCF). A hybrid controller polls stations during a contention-free period. The polling grants a station a specific start time and a maximum transmit duration.

EDCF appears to be gaining more early acceptance than HCF. The 802.11e standard isn't likely to be ratified until next spring or later. In the meantime, a group of vendors have proposed Wireless Multimedia Enhancements (WME), much like Wi-Fi Protected Access, to provide an interim QoS solution for 802.11 networks.

Without a standard, the risk of non-interoperable mechanisms proliferating in the marketplace would inhibit the overall goals of the 802.11e standard. The intention of WME is to provide a well-defined and accepted 802.11 QoS mechanism that will prevent the spread of non-interoperable methods while waiting for the ratification of the 802.11e standard.

The process of creating a definitive standard can be slow, but the IEEE 802.11e standard will address existing QoS concerns.

Thomas is a product manager for wireless LANs at Alcatel. He can be reached at Jeff,Thomas@alcatel.com.

Ask Dr. Internet By Steve Blass

We want to track available bandwidth, maximum rates and other network statistics, and display the results graphically. Where can I find software to determine available bandwidth between pairs of intranet and Internet network links?

The Cooperative Association for Internet Data Analysis (CAIDA, www.caida.org) provides links to a number of commercial and open source software tools for monitoring, measuring and visualizing network performance information. If you are polling from a large number of SNMP devices, take a look at the Real Traffic Grabber. To measure performance statistics between endpoints from one end, you could use pchar. If you can run probes with root privilege from a Linux system on one end, Sprobe offers an inter esting alternative. If you control both endpoints, pathrate and pathload can be used to measure the capacity and load across Internet paths.

Viznet is a stand-alone Java application that call be used to monitor a connection or to post process a log file. GTrace is a graphical version of traceroute. CAIDA also provides links to a number of visualization and mapping tools such as GeoPlot, MapNet and Otter.

Blass is a network architect at Change@Work in Houston. He can be reached at dr.internet @changeatwork.com.

NetvorkWorld 6/23/03 Technology Update www.nwfusion.com

GEARHEAD INSIDE THE NETWORK MACHINE Mark Gibbs



We've been running hither and thither, and now it is catch-up time. We have been getting a wireless LAN ready for our friend Jim Sterne's Web Metrics Conference in Santa Barbara, Calif. (by the time you read this, a red-eye will get you there for the first day — we'll buy you a drink if you make it).

This wireless system will serve as the conference's private infrastructure, and it gives us an excuse (as if we really needed one) to play with all sorts of tools and hardware we have lying around.

Our plan is to base the conference system on a server running Red Hat Linux 9 and provide wireless service with a Linksys dual-band Wireless A+G Broadband Router so we can offer access to attendees using 802.11a, 802.11b or 802.11g. And there's more.

But before we could get down to building the wireless network, our first task was to install a keyboard/video/monitor

Net for wireless show starts with KVM switch

(KVM) switch. We needed (wanted) this device because we ran out of desk space and setting up our server for the network would have required too much running back and forth to the server room.

The KVM solved this by letting us to switch between all the servers in the server room and our desktop systems, and actually get desk space back! We finally might get down to one or, at most, two monitors on our desk.

Our KVM device, a Raritan Computer Paragon Matrix Switch, had been sitting in the server room for a few weeks taunting us since we reviewed Raritan's IP Reach system (see www.nwfusion.com, Doc-Finder: 6499).

Let us give you the bottom line upfront: The Paragon Matrix Switch system is awesome. It can support both small and large installations, it is easy to install and configure, it is easy to use, and it works flawlessly.

The basic architecture of the Paragon Matrix is as follows: A matrix switching unit (MSU) wired to one or more user stations that are, in turn, connected to a user's keyboard, mouse and monitor.

Devices are connected to the MSU by computer interface modules (CIM). ClMs are small modules that feature a standard monitor connector and cables to connect to the mouse and keyboard ports on the host computers (you can get ClMs that support PS/2, Sun, USB and serial interfaces).

Each MSU can accommodate 16 to 64 computers with video resolutions up to 1,600 by 1,200 pixels, and can switch between two to 16 users depending on which model you choose. The hardware form factor is 1U for all, except for the 16-user, 64-computer model, which is 2U.

What's really neat is that the ClMs, MSUs and user stations all are connected using category 5e cabling. This allows for up to 1,000 feet between users and computers, and Cat5e cabling makes for a very tidy installation compared with old-school KVMs, which required separate cables for every mouse, keyboard and monitor port, creating instant spaghetti.

We did as the manual suggested (unusual for us) and powered down everything before connecting anything (we always have had an inexplicable tendency to indulge in "hot wiring"). When everything was plugged in, we switched on the power and voilà! The Paragon system worked, just like that. Wow! We might start following manuals in the future.

Now, as we said, our installation was sim-

ple: a bunch of computers with CIMs connected to an MSU connected, in turn, to a user station. But you can get much fancier than that: Paragon MSUs can be linked in a tree with CIMs as leaf nodes on any Raritan KVM, allowing for switched access to 2,048 computers. And if you are really playing in the big leagues, you can increase that to 10,000 computers using Raritan's Cascade Matrix Switches.

Raritan also offers ClMs that can be daisy-chained, letting one MSU port support up to 42 computers for a maximum of 2,688 computers on one 64-port MSU.

The interface software to select which computer you connect to is easy to use, and the built-in management system is well designed. It lets user stations be secured through usernames and passwords. These user accounts also can be associated with groups having various levels of access to specific computers.

This is definitely the best KVM product we have tested. Outstanding.

So we got the Raritan Paragon system working and our next task was to get ... well, you'll just have to wait for next week to find out.

Switch your thoughts to gearhead @gibbs.com.



Quick takes on high-tech toys By Keith Shaw

andspring and Nokia last week announced two new converged devices (cell phone plus PDA) to help make business users more productive when mobile. Both devices are voice-centric, which means they look, feel and act more like a cell phone than a traditional PDA.

Handspring launched the next generation of its Treo communicator converged device, the Treo 600. It's smaller and looks more like a mobile phone than the previous Treo models. The Treo 600 still has an integrated querty keyboard, and Handspring made it smaller yet more tactile by changing the shape of the keypads. Handspring says the dome-shaped keys have a larger surface area, which will make it easier for users to type out messages than with previous models.

The Treo 600 is Handspring's first device to use Palm OS 5, and features an ARM-based processor. Handspring moved the navigation buttons from the bottom to just above the keyboard. This makes it much easier to operate the Treo 600 with one hand, as the thumb goes more to the center of the device. The Treo 600 also includes an "error avoidance" software feature that determines which key is intended when two keys are pushed at the same time.

Two versions of the Treo 600 will be available, a Code Division Multiple Access 1x (CDMA1x) version and a GSM/General Packet Radio Service version. Sprint an Jounced that it would carry the Treo 600 on its CDMA

Converged devices have cell phone feel

1x network, and Orange (based in the U.K.) is one of the GSM carriers. A GSM/GPRS carrier in the U.S. has not yet been announced.

In addition to the cell phone and PDA functionality, the Treo 600 includes an embedded VGA digital camera and a proxyless version of the Blazer Web browser, which will enable full Web browsing and the ability to secure access to corporate networks, Handspring says. The device will include a 160-by-160-pixel color screen and will have 32M bytes of memory. In addition, a Secure Digital I/O slot will be included for expansion capabilities, the company says

Pricing has not yet been determined and likely will be set by carriers. The Treo 600 is expected to be available by fall.

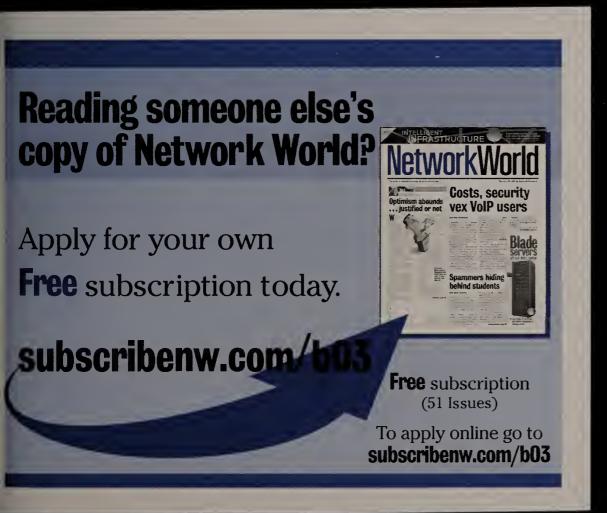
Nokia's new converged device, the Nokia 6600, is expected to be available in Europe, Africa and Asia-Pacific markets by the fourth quarter. The new phone includes personal information mananger functionality and an integrated VGA camera with a 2X digital zoom lens. Nokia says the 6600 will be able to "capture, send and receive video clips with audio," and will be able to receive streaming video content in RealVideo and 3GPP streaming formats. In addition, the 6600 includes Secure Sockets Layer support and a VPN client, to let companies provide secure access to their internal networks via the device.

Applications developed on the Symbian 7.0 operating system or Java can be downloaded to the device, Nokia says, and the device will contain 6M bytes of storage space. A 32M-byte MultiMedia Card will be included for additional storage.

Other features include Bluetooth and infrared connectiv-

ity, and integrated TCP/IP technology to help speed over the-air file downloads. For end users still concerned about the talk time on the device, Nokia says the 6600 will have talk time up to four hours and standby time up to 10 days.





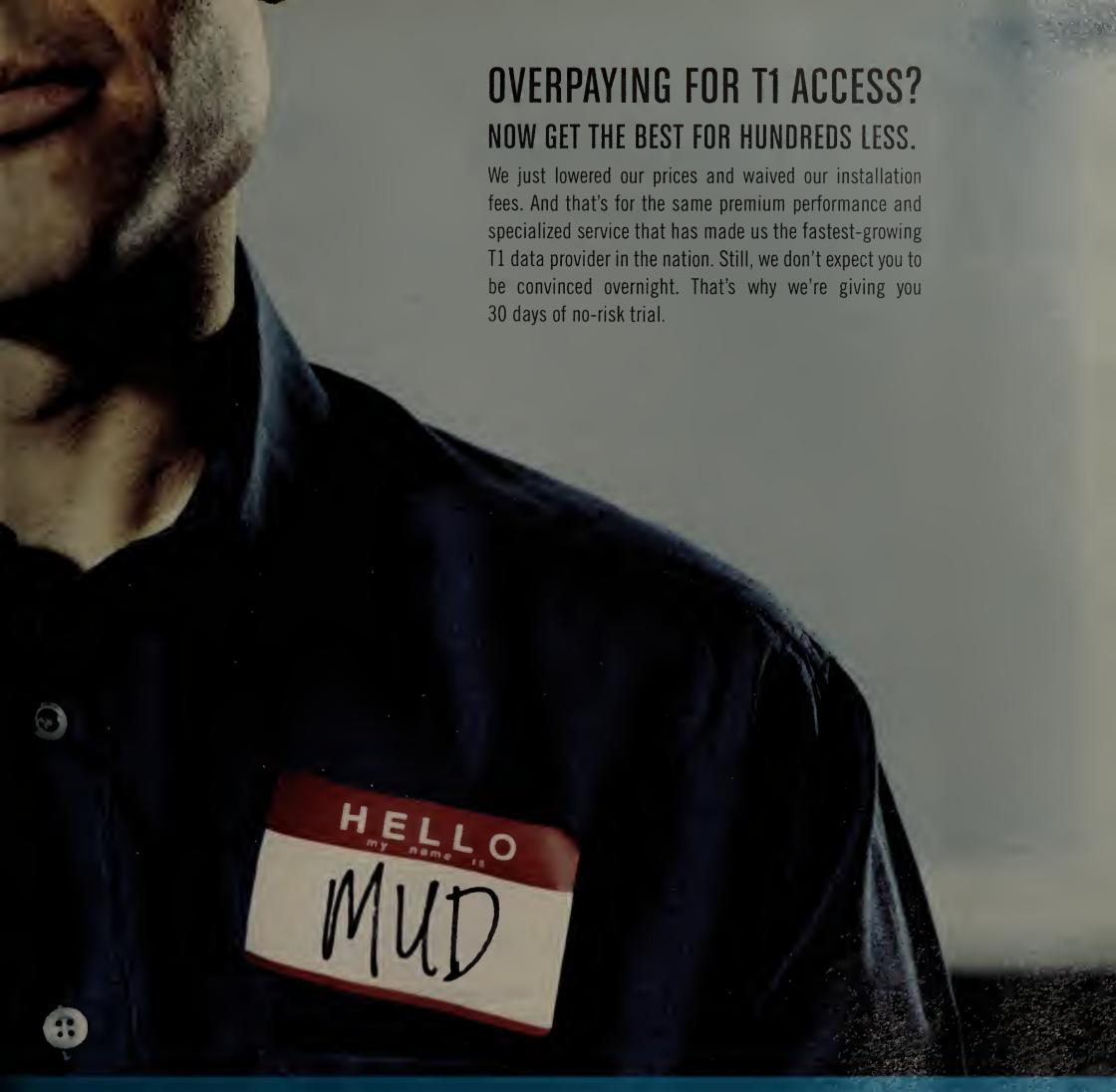
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COVAD



EDITORIALJohn Dix

SCO fly, don't bother me

f The SCO Group's original \$1 billion law suit filed in March didn't get IBM's attention, the amended complaint filed last week seeking three times the damages and an injunction prohibiting the sale of AlX might have done the trick.

SCO apparently is pursuing the case — in which it alleges IBM took SCO's Unix code and spilled it into Linux — because it realizes it is easier to generate a profit nailing down intellectual property rights than selling software. The company has created a whole division, SCOsource, to do nothing but chase Unix licensing revenue.

And it's working. For the quarter that ended April 30, SCO reported its first ever quarterly profit of \$4.5 million, largely on the strength of two SCOsource licensing agreements.

Does SCO have a case with IBM? Read the SCO document (www.nwfusion.com, DocFinder: 6435), and it sounds fairly solid. IBM isn't talking much, but read the OSI Position Paper on the SCO-vs.-IBM Complaint by Eric Raymond, president of the Open Source Initiative (DocFinder: 6436), and the suit sounds like a house of cards.

While Raymond disavows knowledge of IBM's contractual dealings with SCO, he knows the history of Unix and discusses it at length. Two of his important points: 1) Unix is actually a family of operating systems "with common design elements" (raising questions about whether SCO can lay claim to all of them); and 2) any rights SCO has to Unix "had been substantially impaired" before SCO acquired them by a lawsuit in the early 1990s (raising questions about this whole thing being moot).

The history of Unix is so tangled that it will be hard to discern who contributed what intellectual property when and who has subsequent rights. And whether you believe SCO or IBM or Raymond, the chances are that proprietary code has been mixed into Unix somewhere along the line. Whether that code is pertinent to this case and causes it to swing one way or another remains to be seen.

But the case does serve as a reminder that, benefits aside, open source products occasionally might be entangled in this kind of mess. It is more important than ever to document the origins of open source code and research its roots.

Sadly, regardless of the outcome of the SCO suit, the legal wrangling will take time to resolve and the open source community likely will lose some momentum, if not get something of a permanent black eye. And that's a shame.

— John Dix Editor in chief jdix@nww.com

opinions!

Explanation needed

In Johna Till Johnson's column "The extranet emerges . . . right on cue" (www.nwfusion.com, DocFinder: 6427), she states: "What's needed instead is a more sophisticated security architecture that provides graduated access to resources permissions that are based on a user's identity. Many organizations are beginning to put into place a three-tiered security model that addresses such issues." How about a story explaining what that is? Is it Novell's best practice model of IDVault, plus LDAPv3 directory, plus operating system directories provisioned by Ichain, or is she referring to something else?

Dennis Brewer
IT solutions specialist
State of Michigan, Department of Information
Technology, Office of Research and Policy
Lansing, Mich.

Stopping spam

Regarding the Face-off "Are filters more effective than laws in stopping spam?" (DocFinder: 6428): There is merit to legislation and filtering and the idea that both should be pursued until spamming isn't financially viable. Legislation is the "blue sky option," but back to reality — get Bayesian filtering now. You won't be disappointed.

As one of the oldest messaging service providers in North America, my company has seen the growth of the spam problem for our corporate customers firsthand. Our most recent spam-filtering service has implemented four different methods, including Bayesian filters. Each one compensates for the weaknesses of the other and the results exceed 99% effectiveness with less than 0.5% false positives.

Spam is no longer a problem for customers using

E-mail letters to jdix@nww.com or send them to John Dix, editor in chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.

our service. Our hats are off to Paul Graham's Bayesian filtering techniques; they really work. My advice is to get Bayesian filtering in place now and then work on lobbying for legislative change.

Adam Hyde Director of product strategy The Electric Mail Company Bellingham, Wash.

Two men, describing a large fish by starting at opposite ends, will not produce the same description, although in the end they describe the same thing. Such is the case with Paul Graham and Jason Catlett, where each starts at the extreme and meets near the center. To say filter or law is the way to go to stop spam is too narrow a view, and compromises are inevitable. Do we stop theft by lock or law alone?

Both filters and laws have their place in mitigating spam. Laws will only ever be a deterrent; spam will continue to plague us as long as open Simple Mail Transfer Protocol relays continue to inhabit the 'Net.

Richard Danielli CEO and president eSubnet Enterprises Toronto

Technologically illiterate legislators are proposing new spam laws. Companies that are having a hard time dealing with the free flow of information across the Internet are putting these laws forth. Technology will not solve the "problem"; training and continued use of the Internet will. There is a correlation between users that complain of spam and their level of technical expertise.

As advertisers realize that spamming is not profitable, it will stop, and the legislators and companies selling anti-spam software will declare an unearned victory. If, however, it is profitable, it will not stop and will change to more closely fit the need.

Alfred Brock Canton, Mich.



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STRATEGY SESSION

Jeff Kaplan

ot long ago, the battle for telecom supremacy meant the incumbent local exchange carriers and interexchange carriers had to offer a broad array of network and IT services to win and protect customers. A combination of factors has forced them to re-evaluate this strategy and refocus

their energies on their core competencies of transport services. This retrenchment eventually could lead to their return as a key element in the utility computing services market.

The carriers used their newfound freedom in 1983 to pursue a variety of new businesses, including systems integration and outsourcing. They set up divisions aimed not only at addressing customers' network integration and operations needs, but their IT requirements as well. This put them in direct competition with Andersen Consulting (now Accenture), Computer Sciences Corp., Electronic Data Systems and IBM, among others. These efforts failed because the carriers barely understood data communications, nevermind data centers.

The telephone companies' systems integration and outsourcing failures in the 1980s and early 1990s didn't discourage them from pursuing another promising new business in the late 1990s: Web hosting. Again, many of the carriers not only established business units that offered the communications necessary to ensure proper connectivity to hosting facilities, but also built their own hosting facilities to compete with the leading players in this market. This time, they failed because the demand for hosting services was far less than forecast.

It appears some carriers finally have learned their lessons from

Telcos find their place

these experiences and are returning to their primary business of providing bandwidth and connectivity services. Specifically, these companies are building out their IP/Multi-protocol Label Switching-based networks and packaging an assortment of managed services that will complement the utility computing services offered by their partners.

BellSouth and Qwest are offloading their hosting businesses to IBM and HP, respectively. SBC and Verizon also have pulled back from pursuing Web hosting services aimed at the complex needs of enterprise customers. The ILECs have recognized that they are more likely to succeed in utility computing and the broader e-business market by partnering with other companies that have greater skills and resources.

Not everyone has heeded these lessons. Sprint is still promoting and delivering an array of application and other managed services to enterprise customers. Unlike AT&T, which is partnering with companies such as Siebel, and MCl, which is promoting its converged network services, Sprint is playing the "prime contractor" role and turning to partners on a case-by-case basis. This approach is destined to fail because corporations don't believe carriers are qualified to solve their computing needs. Proof of this is Sprint's recent decision to offload the bulk of its Web hosting business to thirdparty providers.

The ILECs and IXCs that have accepted their role in supporting their enterprise customers' network requirements should be congratulated. Companies should be wary of carriers that don't know their limitations.

Kaplan is managing director of THINKstrategies, a consultancy in Wellesley, Mass. He can be reached at jkaplan@thinkstrategies.com.

Some carriers ... are returning to their primary business of providing bandwidth and connectivity services.



CACHE ADVANCE

Linda Musthaler

ham, spam, no thank you, ma'am! Spam is out of control, and it's time to get serious about ridding ourselves of

The time and money we spend dealing with unwanted junk e-mail is staggering. According to Forrester Research, the average consumer

receives 110 junk e-mails per week — more if your e-mail service doesn't screen out spam. IDC estimates that a company with 14,000 employees spends \$245,000 annually to fight spam. According to Ferris Research, U.S. corporations will spend \$10 billion to combat the problem this year, including the cost of lost productivity, additional equipment, software and manpower.

For me, the problem is more personal than just time and money: I have had my e-mail identity stolen and used for spam purposes. Some idiot has usurped my business e-mail address and used it as the proxy name for sending out his garbage. Now it appears as though pornographic spam is coming from me, even though the originating IP address does not belong to my company.

This seems to be the year when we get mad as hell about spam and don't want to take it (or receive it) anymore. From government-sponsored conferences, to legislation, to new tools and technologies, everyone is anxious to address the problem before it renders e-mail too cumbersome to use. Alas, there are no quick fixes.

Most of us attack the problem with technology. The most effective tool — and I use the term "effective" lightly — seems to be the spam filter. Maintaining these filters is time consuming and expensive, and spammers are constantly inventing ways to get around them.

I give low marks to a new technology approach called "challengeresponse," which requires that an e-mail sender confirm his authenticity before his message is delivered to the recipient. The thought is that a spammer sending thousands of e-mails at a time won't want to confirm his sincerity to each of his targets. Not everyone will use the technology,

Time to rein in spam

though. A person has to activate this option in his e-mail system to challenge all incoming mail, and he can develop his own list of pre-authorized senders whose mail shoots straight through. All other e-mail is locked out until the sender answers the challenge. EarthLink has started to offer a challenge-response service to its e-mail customers.

I can't see this technology gaining general acceptance. It's too darn inconvenient for legitimate e-mail users. I encountered my first challenge last week while replying to a friend's note, and was miffed at the inconvenience, so I never sent my reply. I wonder if my friend knows how much e-mail she is missing because of this.

Federal and state government bodies are attacking the spam problem with legislation. Critics say this won't stop the problem, as laws aren't effective outside our borders, and spammers can easily move their operations offshore. Still, we need legislation to define what is acceptable behavior and what isn't. While it might not be illegal to send out millions of e-mails per day, we can make it illegal to, say, steal someone else's identity (like mine) to send out these messages.

The key to making any legislation effective is to get worldwide agreement on it. Just like nuclear proliferation, it's no good if one country supports disarmament and others don't. Unfortunately, there are too many countries that won't or can't act against spam.

Meanwhile, vigilantes are taking action against the spammers. A loose affiliation of spam-fighters attacks spammers with their own treatment: they overwhelm the spammer's servers with mail. One "soldier" attacked a spammer's operations by making all the company's phones ring at once, forcing the "marketing firm" to shut off its phones for a while. I smiled when I heard about this.

Spammers deserve all the technology, legislation and payback we can throw at them. I say, beef it all up and shut 'em all down. We have to make it unprofitable and inconvenient for them to make a living this way.

Musthaler is vice president of Currid & Company, a Houston technology consulting firm. She can be reached at linda@currid.com.

Everyone is anxious to address the problem before it renders e-mail too cumbersome to use. Alas, there are no quick fixes.



KNOWLEDGE PROPELS

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Bouncing back to back to

Four years ago, ABM Industries, a \$1.8 billion building services company, decided to switch from a solid, dependable, managed frame relay network to DSL connections from a variety of service providers. The goal was to lower the cost of linking branch offices to corporate headquarters.

"A lot of vendors and service providers who are no longer in existence wanted to get rid of our frame relay network. They said that using a VPN with DSL would be a great way to go," says Barry Wilson, manager of video, voice and e-learning for the San Francisco company.

But from the start, there were latency and other service problems. "Before long, we had angry branch managers. There was almost a revolution," he says. The final straw came in late 2001 when service from one DSL provider disappeared for good. "NorthPoint folded one night and left us with 20 offices with no service," Wilson says.

The IT staff scrambled and provided dial-up connections to the branch offices that used NorthPoint. Shortly thereafter, ABM switched all its branch offices back to a managed service from one vendor — AT&T's enhanced DSL service, which provides a Covad Communications DSL connection to AT&T's frame relay network.

Like ABM, many companies burned by the well-publicized bankruptcies of service providers and metropolitan Ethernet players became leery about deploying new broadband services. But after spending a year trying to do videoconferencing internally and not being happy with the results, ABM bit the bullet and successfully contracted with an application service provider.

Today, ABM uses Covad symmetric DSL connections to Wire One's Glowpoint network for group videoconferencing. Wilson says that most of the time the video and audio quality is like watching TV, although there is occasional audio delay when connecting multiple sites.

And ABM isn't the only company that has overcome

its concerns about broadband. Alyeska Pipeline, which runs the Alaska Pipeline, plans to spend about \$3 million this summer to upgrade nearly 1,500 desktops to support multimedia. The upgrade will include speakers, Windows XP, the current version of Microsoft Media Player, processor speeds of at least 1.4GHz and minimum memory of 512M bytes. The company also is upgrading its 20 multimedia rooms with state-of-the-art videoconferencing systems and IP/TV, Cisco's streaming solution that uses multicast to efficiently distribute video traffic on the network.

Because Alyeska operates several remote pump stations in an isolated, weather-challenged environment, travel for meetings, training or even healthcare is difficult. Therefore, the company uses its private ATM network for distance learning, tele-medicine and meetings.

The upgrades will let Alyeska simultaneously stream live training sessions to the multimedia rooms, so employees won't spend so much time in cars and on airplanes. Ultimately, Alyeska is looking to bring IP/TV to the desktop.

Alyeska's available bandwidth of eight DS-3s is far greater than the three DS-3s currently used, "but new capabilities will absorb that bandwidth," says Erv Barnes, CIO of Alyeska. "People can never get enough of any infrastructure that will let them communicate."

If you're thinking about rolling out a new broadband service, here's an analysis of the various options.

What's happening now

Nearly all Fortune 1000 companies have deployed group or conference room videoconferencing over ISDN and some now are rolling out videoconferencing over IP. Many also use streaming for executive speeches, training videos, watching videoconferences without participating and reviewing videoconferences after they end.

Several are embracing Web conferencing for online meetings. The service lets multiple users view and annotate documents and whiteboards simultaneously while sharing applications. "Web conferencing was a bigger business than videoconferencing at the service provider level last year," says Andrew Davis, an analyst at Wainhouse Research.

The primary options for deploying broadband applications over IP are building a converged network or using a service provider to deliver videoconferencing over a dedicated IP network. ABN Amro, a multinational banking firm, uses Wire One's IP network rather than its own data network for video traffic.

"To move video traffic onto the [converged] IP environment, we'd have to have a compelling reason. We would need to have guaranteed quality of service," says Ed Horan, telecommunications manager for ABN Amro. "I would be putting my traffic, which I have to have 100% reliability, onto a network that I don't have the guarantees for."

On the other hand, Bristol Myers Squibb (BMS) is using a converged IP network as its primary transport for video. Internally, BMS has "overengineered" its network to create excess capacity. This lets the network team provision 3.5M bit/sec for videoconferencing, while most room videoconferencing systems only run at 384K bit/sec.

However, many BMS employees telecommute, and this has created some quality problems because home firewalls strain network resources and reduce the quality of videoconferences. Also, DSL services are mostly asymmetric, meaning the upstream bandwidth is far lower than the downstream. This is fine for data, but it causes problems for real-time video, says Mark Lamon, director of informatics at BMS.

Dow Chemical uses streaming, videoconferencing and Web conferencing extensively over a converged mostly IP network. Employees throughout the world can communicate and collaborate via nearly 400 interactive conference rooms called iRooms, and Dow constantly is expanding the number of rooms and capabilities.

While IP videoconferencing in conference rooms is beginning to take hold in corporations, few large companies are deploying personal systems. And despite strides some companies are making in deploying converged IP networks, videoconferencing generally is still part of the

telecom world.

"Deployment of IP networks for IP videoconferencing has stalled because videoconferencing systems in the field today are used, by and large, a low number of hours per month," Davis says. "If you have a system you are not using much, it's hard to justify an IP network. ISDN is cheap to have, but it's more expensive to use."

What's on the radar screen

With all the video of product rollouts and executive speeches sitting on dusty shelves, many companies are looking to repurpose video, audio and image assets. Digital asset management products therefore are gaining traction. Many of these products let users search key words that return results corresponding to high-resolution digitized multimedia assets.

By year-end, Dow will offer the last 18 months of videos in a searchable format on its intranet. "We are changing the way we archive and access video to improve global access to video resources and create cost savings," says Christopher Duncan, Dow's global leader of e-communication technology. "One benefit we hope to achieve is if a communication person in Horgen, Switzerland, needs an external video of a plant . . . rather than hiring a crew, they will be able to just search out the type of plant they are looking for." For now, Dow will maintain a physical library and the digital video can be viewed in low-resolution on the intranet.

Against the backdrop of a hostile world, the increasing use of broadband services has put security on the front burner. "You need real-time security," says Gerry Kaufhold, an analyst at In-Stat/MDR. "Maybe your company is in merger talks with another company and you don't want people listening in [to videoconference audio]." To beef up security, network planners increasingly are looking at putting authentication and authorization capabilities in middleware between many broadband applications and the network.

"You're not going to get the number and variety of applications until you get a scalable security infrastructure," says Ken Klingenstein, who directs middleware initiative for Internet 2, a consortium of universities, government agencies and corporations developing applications that exploit broad bandwidth. Both corporations and service providers might implement middleware fea-

tures that protect broadband services. "It's real natural for the last-mile provider to have a set of servers physically proximate to enterprises where these kinds of services could be used," Klingenstein says.

Another area of interest is application integration, which will let users access video, audio, images and text within many applications. "Application integration lets you use information in the context of how you do business, but it places tremendous demands on bandwidth," Alyeska's Barnes says.

Companies expect to increasingly use real-time and stored video as add-ons to Web conferences, presentation software, calendar software, spreadsheets and other applications. "Applications will work the way people want to work ... in an ad hoc fashion," Wainhouse Research's Davis says.

The ability to locate collaborators and launch an unscheduled video interaction with them from any business application is often called presence. "Eighteen months from now, I don't think we'll be talking as much about audio and videoconferencing and collaboration. We will be focused more on the presence question," says Todd Needham, manager of research programs at Microsoft.

Some corporate communication directors are pushing network planners to take streaming video to the next level: 24-hour streamed enterprise news channels. As large corporations upgrade existing networks, periodic streamed events will evolve into constant streaming of enterprise newscasts.

What's out there

Some broadband services currently in test beds will remain in the research community for the next few years

One such service is HDTV over IP, a project of the University of Washington and Internet2. HDTV over IP will ultimately affect enterprise video applications. "It's in the three- to five-year range for the Fortune 1000," says Jim DeRoest, University of Washington's assistant director of computing and communications. "Because of the resolution available, it opens up a whole area of opportunity in [business-to-business] efforts for architectural firms designing airplanes or manufacturing or anybody who is collaborating in the video space where resolution is

important."

Studio-quality HDTV, which the University of Washington has streamed uncompressed at 270M bit/sec, would absorb 25% of an OC-48 pipe. However, broadcast quality compressed HDTV streams run at less than 20M bit/sec and are ultimately more practical.

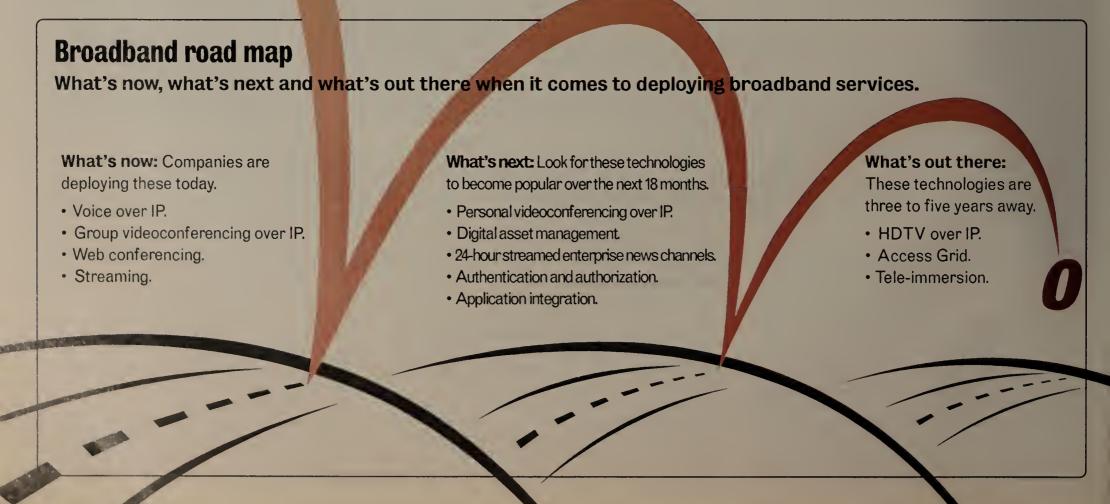
Other broadband services in test beds include teleimmersion and access grid. Tele-immersion takes videoconferencing and virtual reality several steps forward. The idea is that people in one location can feel as though they are in the same office or cubicle with one or more collaborators in other locations. Teleimmersion uses large screens, cameras, advanced scanners and sensors to create the "tele-cubicle" or the "office of the future."

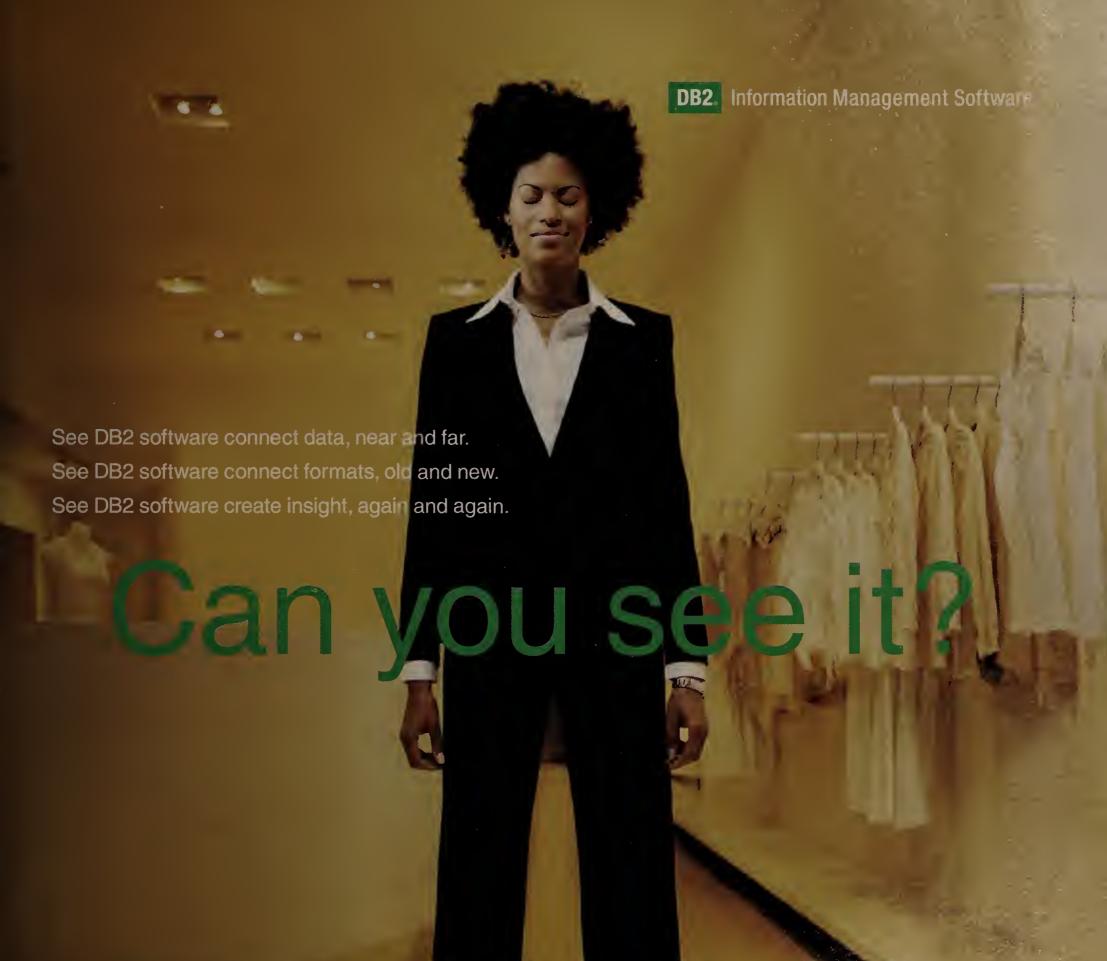
A tele-cubicle appears to become one quadrant of a shared virtual office space. This space virtually combines furniture in two or more tele-cubicles to produce one larger cubicle or office that several collaborators in different physical locations share. Software intelligently retains or discards furniture and other attributes of each tele-cubicle.

Access Grid, developed by Argonne National Laboratory, is more practical than tele-immersion. The project uses room-oriented semi-immersive visualization systems that require multiple projectors and cameras in each location. Access Grid allows video and audio interactions and collaborative capabilities. Boeing, Ford, Johnson & Johnson, Microsoft and Motorola have nodes on the Access Grid network used primarily by university and government laboratories globally. Access Grid uses Internet2's Abilene backbone, currently being upgraded from 2.5G to 10G bit/sec. The backbone is multicast and IPv6-enabled end to end.

While it will take years for most large corporations to use these futuristic applications, other companies are dipping their toes back into broadband services. Says Scott Boyer, vice president at Yipes Communications, "We're noticing now there's not so much intense scrutiny about, 'Are you going to be around tomorrow or next month?'"

Rosen speaks on broadband topics. He is chief strategist of Impact Video Communication in San Francisco and can be reached at erosen@impactvid.com.





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NetworkWorld

ENTERPRISE LINUX SERVER DISTRIBUTIONS

Red Hat beats out UnitedLinux

■ BY TOM HENDERSON, NETWORK WORLD GLOBAL TEST ALLIANCE

hen we pitted Red Hat Enterprise Linux against several flavors of UnitedLinux to see how each fared as an enterprise server platform, we found each edition of the popular GNU/Linux operating system to represent a distinct method on how to build bare metal into a working server. Installation is different, configuration options are different, and hardware support varies across these Linux flavors.

We selected Red Hat's Enterprise Linux as the Network World Blue Ribbon winner in this test because while the systems were somewhat comparable in terms of performance and management wares, Red Hat offers more hardware support, is easier to configure and offers more security options.

Red Hat Enterprise Linux comes in numerous flavors, ranging from a \$179 desktop/workstation edition called Enterprise Linux WS Basic Edition to the Enterprise Linux AS Premium Edition we tested. The premium edition, which costs about \$2,500, is distinguished from its siblings by clustering capabilities, additional hardware support and service options.

UnitedLinux is a consortium of product/service vendors, comprising founding Linux operating system distributors SuSE Linux, The SCO Group, Conectiva and TurboLinux, and application vendors such as Oracle, which contributed Oracle 9i to the mix. This consortium is an effort to bring a standard code, feature and configuration set to Linux distributions so that applications developed under UnitedLinux can take advantage of standards in each UnitedLinux product.

The code base and infrastructure of UnitedLinux editions has SuSE Enterprise Linux as an ancestor. A modified SuSE YAST2 front-end installation program serves as

a common denominator among the four UnitedLinux versions and ensures that setup among the distributions is identical. But after installation, each UnitedLinux edition branches out to suit a target market.

Initially, all four consortium members offered distributions for this review. But SCO pulled its support for UnitedLinux, and pulled out of this review. (See www.nwfusion.com, DocFinders: 6429, 6430 and 6431.)

We reviewed the SuSE UnitedLinux version extensively, but because the Conectiva and TurboLinux versions are focused on the Brazilian/Portuguese speaking and Southeast Asian markets, respectively, we did not test them extensively.

While neither SuSE UnitedLinux nor Red Hat's distribution strayed from its Linux Standards Base (a reference platform that ensures that all applications can run across Linux distributions), hardware support favored Red Hat, if only for a larger driver base and advanced hardware detection. But we found that all hardware items were discovered and configured correctly, with few mistakes made by each distribution vendor. All UnitedLinux distributions behaved identically.

The custom-installation option on Red Hat offers a variety of choices relating to what software you want installed, disk partitioning, and boot loader selection. Alternatively, an installation wizard can make these choices for you. The wizard worked well and mostly

made astute choices, although it divided our disk arrays into seemingly bite-sized devices with seven partitions. By contrast, the UnitedLinux distributions divided the two disks we used into larger chunks, which is a better way to reserve server space for future operations.

Red Hat also let us enter a network address, but didn't probe the network for other settings, such as a DNS server or gateway, and incorrectly guessed what those were. It also identified sound devices that didn't exist in our hardware. Red Hat easily understood the number of platforms we installed it on, including the symmetric multiprocessing boxes.

Red Hat's wizard then let us select high, medium or low security settings, gradients that were customizable after installation but also have a strong bearing on initial functionality. The security setting choice is important because the installation program leaves the server in remarkably different conditions from a communications standpoint. Servers are used for many purposes: For example, the gradient of security needed to tailor a server for a Web server as opposed to an application server can be very different. Red Hat's security choices let us easily position the server for gradients of service that otherwise take a long time to manually adjust settings in individual applications.

The default installation can place as little as 61M bytes or as much as 1.5-plus G-bytes if you install all software packages (full firewall, e-mail, Web services, development components and the like). The drivers that the operating system chose initially weren't necessarily the most recent or stable versions, but Red Hat, like UnitedLinux/SuSE, doesn't do an Internet search to find up-to-date drivers such as Windows server platforms.

As previously mentioned, the UnitedL/SuSE version uses a rendition of the YAST2 installation program. This UnitedLinux variation of YAST2 differs from the tool found in other SuSE versions in that the default number of software packages installed is much smaller. The only difference among the three UnitedLinux installation applications was the ability for each application to subsequently install version-specific applications that would run on each server, such as mail, firewalls and development environment.

Each UnitedLinux distribution has three common CDs, with up to three more offered that include distribution-specific add-ons. These add-ons can be important; we found a dearth of useful tools in the base UnitedLinux and welcomed the SuSE CD that included wares to configure network resources and automate system setup.

UnitedLinux correctly found all the hardware devices in our platforms but couldn't readily detect the four-

Net Results

A.13 BLUE RIBBON WINNE

Red Hat Enterprise Linux Advanced Server 9

Company: Red Hat, www.redhat.com Price: \$2,499 (includes 24-7 support); cost can be reduced to \$1,499 for abbreviated support hours. Pros: High hardware compatibility, strong security integration, feature-rich. Cons: Expensive high-level support; occasionally weaker management.

RATING 4

UnitedLinux/SuSE Enterprise Linux Server 8

Company: SuSE, Price: \$749 includes one-year maintenance contract (\$699 each additional year). Premium support costs \$2,250/year. Pros: Uniform, strong management. Cons: Minor availability issues; tougher to secure.

| The breakdown | Red Hat Enterprise 公人 Linux Advanced Server | UnitedLinux SuSE | |
|------------------------------|--|------------------|--|
| Installation/integration 25% | 4.5 | 4 | |
| Performance 25% | 4 | 4 | |
| Management 25% | 4 | 4 | |
| Security 25% | 4 | 4 | |
| TOTAL SCORE | 4.13 | 4 | |

■ Scoring Key: 5: Exceptional; 4: Very good; 3: Average; 2: Below average; 1: Consistently subpar

See Linux, page 66

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untirued from page 64

Xeon CPU configuration in our HP ProLiant DL580 server, Red Hat found it without assistance. After we changed a BIOS value, UnitedLinux correctly found the multi-CPU configuration and adjusted to it.

Up and running

We performed our tests on an HP ProLiant DL580 server with ext3 filing system, a journaled file system that has proven to be more resilient than the 'native' ext2, the traditional Linux default setting, and a RAID 1 (mirrored single drive) configuration. Both UnitedLinux and Red Hat recovered from a simulated drive failure. A simulated CPU failure test proved more difficult, as Red Hat survived but UnitedLinux/SuSE froze. After our testing, SuSE provided settings that it said should prevent this problem.

Network load balancing on the HP ProLiant DL580 also was difficult for SuSE, which took about 10 seconds longer than Red Hat to recover from an ipchained (ipchain is a TCP/IP protocol management method) network card connection termi-

Both distributions can emulate NetWare 2.X servers and AppleTalk Servers. Built into both is support for Samba, which can emulate Windows NT primary domain controllers. We found that the UnitedLinux/ SuSE-specific controls gave us more automated control over Samba.

Both UnitedLinux and Red Hat support a variety of VPN methods, including IP Security, Secure Sockets Layer, SOCKS5 and even Microsoft's Point-to-Point Tunneling Protocol VPN method. Red Hat supports several different encryption methodologies, ranging from RSA RC3 to Enfish.

Both products support network card traffic load balancing. In our tests, we found little difference between the distributions because they use similar applications for load balancing.

We made several tech support queries to SuSE and Red Hat using a third party's credentials. We sent via e-mail four questions to both providers that ranged from neophyte to advanced, to both providers. Red Hat replied with the answers within an average of two hours, and SuSE within eight. All answers were correct, but the replies from the Red Hat staff added more information about the suggestions they

Performance

To assess performance, we looked at two types of measurements that we've also used in our Windows 2003 assessment, (DocFinder: 6423).

The first suite of tests checks Web performance characteristics.

Both versions of Linux tested run Apache as their Web engines, which we installed on an HP ProLiant DL580 platform (see How we did it). Both versions performed comparably to each other and quite well against Win 2003 that we tested on the exact hardware platform two months ago (see performance chart, right).

Red Hat topped its competitors in our transaction-per-second test, in which we tested static Web page transaction cycles downloading 20 4K-byte files per connection as a transaction cycle and our maximum open TCP connections test. The latter test gauges how many open TCP connec-

Charting Linux performance

Both Red Hat and UnitedLinux representative SuSE posted strong performance numbers against Windows 2003 in our Web server stress tests.

Successful transactions per second* 1,204 1,089 994** **Maximum open TCP connections** 87,202 71,885 79,065 **Maximum TCP connections/sec** 1,454 1.844 1,827*

- * Successful transaction/sec downloading 20, 4K-byte files.
- As performed in a previous test (See DocFinder 6423)

tions (relationships) the Web server and underlying network connectivity can sustain. Red Hat beat Win 2003 and United Linux/SuSE in the latter by as much 10% and 20%, respectively.

UnitedLinux SuSE edged out Red Hat and Win 2003 to gain the best numbers in our test of maximum TCP connections/sec test, which measures the capacity of the server to respond to TCP session requests.

With a goal of assessing each product as it ships, we used default settings for both versions of Linux and Win 2003, and we do not implement experimental settings changes that vendors often suggest.

In our second set of disk tests, performance numbers between Red Hat and UnitedLinux were within a 5% margin. With the journaled ext3 filing system kicked in for both Linux operating systems on the HP ProLiant DL580 platform, both copied large files 8% faster (after a 5% margin of error) than Win 2003. For example, an interfolder file copy using cp, the Linux copy function, of an 800M byte file took 32 seconds to copy under UnitedLinux/SuSE, whereas using a CMD copy command under Win 2003 took 40 seconds to execute.

Red Hat consistently recovered from simulated outages more quickly than United-Linux/SuSE but within the margin of error.

We installed the K Development Environment user interface on Red Hat and were impressed by the number of tools Red Hat supported, including a service configuration that let us enable service daemon launch and sculpt command-line arguments associated with them. A Kickstart Configuration tool sets up basics quickly, such as server authentication methods (such as Lightweight Directory Access Protocol, Samba and so on), network, firewall, boot options, installed software packages and the like.YAST2 doesn't provide as many configuration options in a GUI until UnitedLinux-specific extensions are added. When they are, UnitedLinux/SuSE comes much closer to Red Hat's options, but still lacks both management options and structure for them.

Deciding factor

As the comparable performance numbers show, these products are both basic Linux at the core. But in the end, we were decidedly more satisfied overall with Red Hat's hardware integration strengths and security configuration options.

Henderson is principal researcher for ExtremeLabs, of Indianapolis. He can be reached at thenderson@extremelabs.com.

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How we did it

e installed each of the five GNU/Linux distributions on four server plat-

• An HP ProLiant DL580 (four 1.8GHz Xeon CPUs; Compaq Smart Array 5; twin Gigabit Ethernet ports; Emulex Fibre Channel adapter; 2G-byte DRAM; with two Compaq hard disks).

- An HP ProLiant DL380 (two 733MHz Pentium III CPUs; Compaq Smart Array 3; twin Gigabit Ethernet ports; 1G-byte DRAM).
- An HP ProLiant ML330 (1.6GHz Pentium 4 CPU; Compaq SCSI disk interface; single Gigabit Ethernet port; 1G-byte DRAM).
- A Gateway 1U Server (1GHz Pentium 4 CPU; internal ATA-100 interface; 10/100 port; two drives).

The servers were connected via a Gigabit Ethernet switch.

We installed all five total distributions on these five platforms, but focused most of our performance tests on the HP ProLiant DL580 platform. We tested to see if each platform's hardware was successfully detected, and whether options varied from platform to platform. We also checked to see if various disk configuration upto is were available for RAID.

We net up the HP ProLiant DL580 for load-balanced Gigabit Ethernet network or Is and then used a Spirent Communications/CAW Web Avalanche to send masing amounts of traffic to the server for our load-balancing test. We ramped traffic over 5 minutes to see if traffic balanced, and as both distributions use Use applications to balance traffic, we detected no real differences between We also used this test setup to detect recovery from a cable failure.

Surerits Wet Avalanche benchmarks to conduct our Web performance Meira it sis to determine the number of transactions processed per secm mber of TCP connect ons per second, and found them to

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NetworkWorld

■ BY BARRY NANCE, NETWORK WORLD GLOBAL TEST ALLIANCE

OCULAN 250 NETWORK APPLIANCE

s plug-and-play network monitoring a misnomer — or the future? Installing traditional network monitoring software on a dedicated machine or a non-busy server isn't too difficult. However, the idea of getting a monitoring tool pre-installed on a keyboardless, rack-mountable computer is intriguing and compelling, especially for small networks with few spare computers.

Delivering 'plug-and-play' network monitoring

Oculan says its Oculan 250 appliance is the right tool for companies that want comprehensive network monitoring but don't want the hassle of buying a server, configuring and installing the monitoring package along with, perhaps, Web server and database server components.

We found that the Oculan 250 offers excellent device discovery, a range of useful monitoring features, timely notifications of network events, helpful reports and an intuitive, responsive user interface. On the other hand, we found some bugs, such as the software occasionally crashing or emitting Web pages with missing pushbuttons, and we had problems with the documentation (see How we did it at www.nwfusion.com, DocFinder: 6433).

A heavy-duty appliance

The Oculan 250 is a rack-mountable, 2U, Intel-based computer running Red Hat Linux. An Apache Web server provides the user interface's HTML, and a

Postgres database stores network event details and asset inventories. Most Oculan software is written in Java and, although it runs within one computer, the software has a three-tier architecture.

The Oculan 250's monitoring features are certainly comprehensive. The device detects outages, records network events, sends notifications, tracks assets, produces reports, identifies vulnerabilities, monitors Windows server performance factors, measures network performance and watches for intrusions.

One appliance can monitor a network of up to 25 devices, 25 servers and 250 desktops, making it appropriate for small to midsized networks. You can install multiple 250s on a network, but the devices don't coordinate with others by sharing event data or asset lists. For larger networks, Oculan points to its recently announced OpticNerve product. The Oculan 250 polled the services running on our servers and devices every 5 minutes (the default), and we could set each separate service's polling interval to one of five choices: 1 minute, 3, 5 or 15 minutes, or 1 hour. But it missed detecting momentary events where the failure and recovery occurred within the polling interval. The device can only peripherally monitor for service-level agreement compliance.

The appliance can poll about 22 types of network services, including

Citrix, Domino Internet Inter-ORB Protocol, DNS/Dynamic Host Configuration Protocol, FTP, HTTP, Simple Mail Transfer Pro-

tocol, POP3, Internet Message Access Protocol, SNMP and Lightweight Directory Access Protocol. It also can poll database servers running Informix, MySQL, Oracle, Postgres, SQL Server and Adaptive Server. The appliance separately monitored our Internet connection and, once we enabled each server's Windows Management Interface, gathered asset detail and performance statistics from our Windows-based servers.

Statistics monitored include CPU uti-

lization, physical memory, network adapter and disk information, operating system details, installed applications, services running in the background and resource usage figures. Collecting and reporting this level of asset and performance data is a big help.

The appliance made quick work of discovering the devices on each network segment (IP address range) we asked it to monitor. The notification feature promptly sent us e-mail and pager alerts for different types of problems, including "authenticate failure" and "interface down." Furthermore, we could set up separate targets for categories, such as "admin," "desktop" and "security." To our delight, the notification feature was more sophisticated than we expected.

Similarly, report selection let us choose the kind of data, the time interval to report on and whether we wanted the report in Adobe Acrobat PDF, Web page or e-mail format. However, some reports were available only in one format. The reports displayed SNMP data and performance, availability and outage details, security summaries, intrusion attempts, vulnerabilities, system inventories and system performance data.

The intrusion-detection system worked well, as did the vulnerability scan, which recommended specific security patches and configuration changes for the servers we scanned. Oculan says vulnerability knowledgebase updates and the intrusion-detection library of exploits and signatures are included in the one-year warranty. Thereafter, maintenance fees will keep the device's knowledgebase and library up to date.

Use and care

The appliance's Web interface is well designed and responsive. Its top-level menu is a set of links to data displays or further menus on outages, events, notifications, assets, reports, vulnerabilities, system lists, security, performance tools (such as traceroute and ping), appliance administration and product help. To avoid showing stale data, the interface automatically refreshes every minute.

Specifying our network's segments to the device by supplying our IP address ranges was painless. Because the Oculan 250 tracks each IP address or address range separately, we easily could delete or modify an address or range without disturbing the others. This thoughtful design is apparent throughout the interface's various Web pages.

We encountered a few bugs when adding an IP address range on the Intrusion Home Network Configuration page: The tool told us a "save settings" option would next appear. It appeared but was unclickable. On occasion, performing a vulnerability scan crashed the Oculan software. Infrequently, other stray bugs revealed themselves by displaying Java error codes. To its credit, the tool gracefully recovered from these bugs.

We were disappointed in the documentation provided, which consisted of a pair of Adobe Acrobat PDF files downloadable from the device. Using the product's help button redirected the browser window to Oculan's support site, which offered no help on the 250.

We ignored the single-page installation guide Oculan supplied with the unit because it was wrong. A technical support call pointed us to PDF files, which accurately guided us through the installation and initial configuration. For after-hours support, we left voice mail, but callbacks occurred within an hour or so.

All things considered, we liked the Oculan 250. Many of its features are especially noteworthy. The intrusion-detection component is state of the art, the vulnerability checker is quite thorough, and the Windows server asset detail collector is encyclopedic. It's a worthwhile monitoring tool for small networks, and it indeed is plug-and-play.

Nance, a software developer and consultant, is the author of Introduction to Networking, 4th Edition and Client/Server LAN Programming. He can be reached at barryn@erols.com. Nance is also a member of the Network World Global Test Alliance, a cooperative of the premier reviewers in the network industry.

Net Results

Oculan 250 Version 4.0.2.1

4.0

Company: Oculan, (800) 247-5080 Cost: About \$10,000 for up to 25 devices, 25 servers and 250 desktops. **Pros**:

Comprehensive monitoring features; quick device discovery; excellent user interface.

Cons: A few bugs; no printed documentation.

The breakdown

- Monitoring 30% 4
- Discovery 30% 5
- Usability 20% 4
- Documentation 10% 2
 - Installation 10% 3
 - TOTAL COORE 4
 - TOTAL SCORE 4.0
- Scoring Key: 5: Exceptional;
 Very good; 3: Average; 2: Below average; 1: Consistently subpar

TESTER'S CHOICE Tom Henderson



Driver me crazy

continue to have entropy. If you reject unauthenticated drivers or those not the result of an operating system vendor certification/authentication program, you'll often be left high and dry.

What are your options? Complain loudly. Buy elsewhere. Or demand that everyone work together to get a fair and reasonable methodology for fixing the problem. Lacking that, continue to buy aspirin in bulk.

Henderson is principal researcher for ExtremeLabs, of Indianapolis. He can be reached at thenderson@extremelabs.com.

rivers: You can't live with them, you can't live without them. They're the glue that holds hardware designs and operating systems together, a glue that can be as strong as steel or as weak as rubber cement on a hot day. In more than 20 years of network computing, we haven't straightened out the mess associated with these pieces of code that run our computing lives. They're tough to document, tough to install, and the devil to keep fresh.

Once a great hope for stability driver certification programs have become just another profit center for operating system makers, say hardware makers, and they're partially right. We all suffer for lack of crossindustry standards for everything from driver nomenclature to traceability.

For example, while Microsoft, the Linux Standards Base and others have set engineering standards for revision control numbering, driver makers can do as they please, suiting themselves rather than the needs of network engineering personnel.

The hope was that this wouldn't happen. Novell started one of the first network hardware certification programs, and Microsoft and others copied it. In the land of Linux, BSD (and Darwin), and Solaris, things are only slightly less chaotic.

What's the root of the problem? Driver certification is expensive for hardware vendors and it adds significantly to time to market cycles. Take six current versions of Windows, two of MacOS, three of NetWare, two kernels of Linux and so on, and you can understand why hardware vendors reel at the costs of supporting their products under the aegis of various driver certification programs.

One of the great pains of deploying a new operating system is that these new operating systems don't always come with the latest and greatest drivers in the distribution CDs. Having fresh drivers would give you a pleasant out-of-box positive experience — or at least that's the hope.

Instead, the onus is on the buyer to chase down driver software for each device in each system. The purchaser/installer/administrator then must hope the driver is correct for the platform, and with some luck, might have the distinction of being certified by the operating system vendor and authenticated with a digital certificate.

In our recent lab tests, whether on Windows, Linux, MacOS or xBSD platforms, the biggest problem has come from driver updates and synchronization. What could have been a miracle in stability, reliability, and even cost-effectiveness has been dashed against the rocks of complacency.

Lacking standards and protocols for device drivers and downloaded files, we'll



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Management CAREER DEVELOPMENT PROJECT MANAGEMENT BUSINESS JUSTIFICATION

Talking the talk

Tips for improving communication with business management from an IT consultant.

BY BARTON MCKINLEY

Over the years, I've become a frequent traveler in the no-man's-land between IT and business groups. In most cases, both sides cannot talk to each other.

This isn't much of a revelation; it's just the way things are. Most business people talk in terms that relate to their core interests, discussing issues of time, money, process and turf. Of course, techies have their own interests and priorities, and they talk another language altogether.

For IT management, this presents a problem you must learn to overcome. It's imperative that you can speak with your business counterparts and superiors who are not going to learn to "talk tech."

Fortunately, this isn't as hard as it seems. By applying three simple rules, IT managers can greatly improve communications with their business contacts. I'll draw on some specific IT projects to help explain. The names of the people involved have been removed to protect the reticent.

Simplify

About three years ago, I was consulting on the selection and implementation of a desktop management system for 3,000 PCs. This was a multimillion-dollar project.

The IT group wanted something with a lot of bells and whistles but couldn't agree on the details. They argued among themselves. Topics ranged from which products should be evaluated to what types of reporting would be needed to whether servers and mainframes also should be managed. There was no clear agenda, scope or focus.

They were also upset with business management whom they said were "stupid" and "weren't listening."

Meanwhile, business management said the IT people were "too impatient," "too free with money" and didn't "understand the issues." They wanted to know why the project was worthy of discussion and what benefits it would provide

In truth, the technical people had done a poor job of explaining the project, such as purpose and requirements.

Management was thinking of canning the project.

To get things rolling again, I organized sev-

eral sessions in which the technical staff and I distilled the many issues, standards and technical details down to a clear set of requirements and actions. Next, we worked out anticipated costs and a realistic sched-

Tips and tricks

Here are some methods to help break down communication barriers between IT and business departments.

Simplifying

- Use diagrams, charts and examples.
- Stick to the basics when explaining IT, but be ready for questions.
- Keep documents and discussions short and focused on specific tasks, goals, requirements and benefits.

Listening

- Always take notes.
- Supplement meetings with questionnaires.
- Work through issues in a guided workshop if necessary.
- Appoint a dedicated business liaison.

Quantifying

- Detail project timeframes and resource requirements.
- Show dollar costs over time, including total cost of ownership and ROI.
- Present metrics, histories and trends for network, application or system performance.

ule for the project.

Finally, we identified the principal benefits and risks of the project, linking any technical gain to a tangible business benefit. For example, implementing a new desktop management services suite and remote diagnostics were linked to leveraging of prior investment and a reduction in annual help desk costs.

When we presented the plan, details were supplemented with figures and diagrams. Business received a full explanation of project goals, scope and cost. And while there were some more questions, the project got the nod and work started.

In essence, we focused our message, removing extraneous technical details. Simplify all aspects of communication with your business counterparts.

Listen

On a more recent project, the client was rolling out a Web-based application for more than 4,000 users. Management wanted IT to develop a robust network and security architecture in order to replace a mix of dial-up, ISDN and LAN services.

The client had tried for months to explain its goals and requirements to IT. Unfortunately, its explanations were vague and didn't provide the type of information that IT management needed for planning.

For example, the client wanted the architecture to support aggressive user response times but didn't know how much traffic the application would generate. On the flip side, IT hadn't asked important questions.

Both groups were frustrated. Business management suggested that IT was being dismissive and wasn't listening. Coincidentally, IT management wondered if their business peers knew what they wanted.

So on behalf of IT management I met with business management and asked questions about the project — who, what, where, when, why. We also discussed their ideas and concerns for the future of the project and how they felt that IT could help. When I reported to IT management, the group sent me back with questions of its own.

This went on for about three weeks. In the process, IT executives began to listen to what their counterparts had to say (and vice versa). The needed information was collected, requirements were defined, and I

completed the architecture.

To get the information you need from business management, ask cogent questions and really listen to the answers.

Quantify

For another project, I worked on an IT audit and upgrade plan for a national agency with a central office.

Before the plan was finished, an internal group decided to make greater use of their Graphical Information System, which meant an increase in GIS traffic on the corporate Ethernet.

The GIS group was a minority among the hundreds of users on this network. Just the same, they wanted the network upgraded from 10M to 1G bit/sec so they would have improved turnaround on their GIS queries.

Naturally, this idea did not sit well with IT management, who felt that the requested upgrade would disrupt operations, at great cost, with little justification.

Things heated up when the GIS group got business management to endorse its plan as a strategic imperative. IT management's concerns were insufficient to dissuade their counterparts.

So IT management monitored the GIS traffic and used the collected data to calculate realistic bandwidth requirements and formulate a new upgrade plan. They compared the new plan with a full upgrade, on the basis of cost and effort.

Armed with real measures, calculations and costs, IT management convinced business management that a full upgrade was unnecessary. As a result, the GIS group was content in getting a 100M bit/sec virtual LAN, and business went back to normal.

To help make your case with business management, quantify the details and focus on the facts.

Naturally, there's always more to the interaction between IT and business management that hasn't been mentioned here. But if you remember to simplify, listen and quantify, you'll find that no-man's-land isn't as tough to cross as it used to be.

McKinley, president of Summit Communications, is a seminar leader and IT consultant specializing in network, security and IT business alignment strategies. He can be reached at strategist@summit-com.

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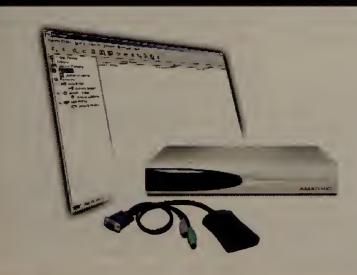
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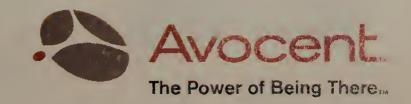


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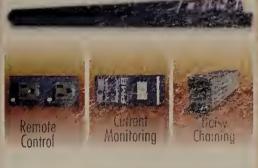
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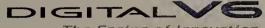
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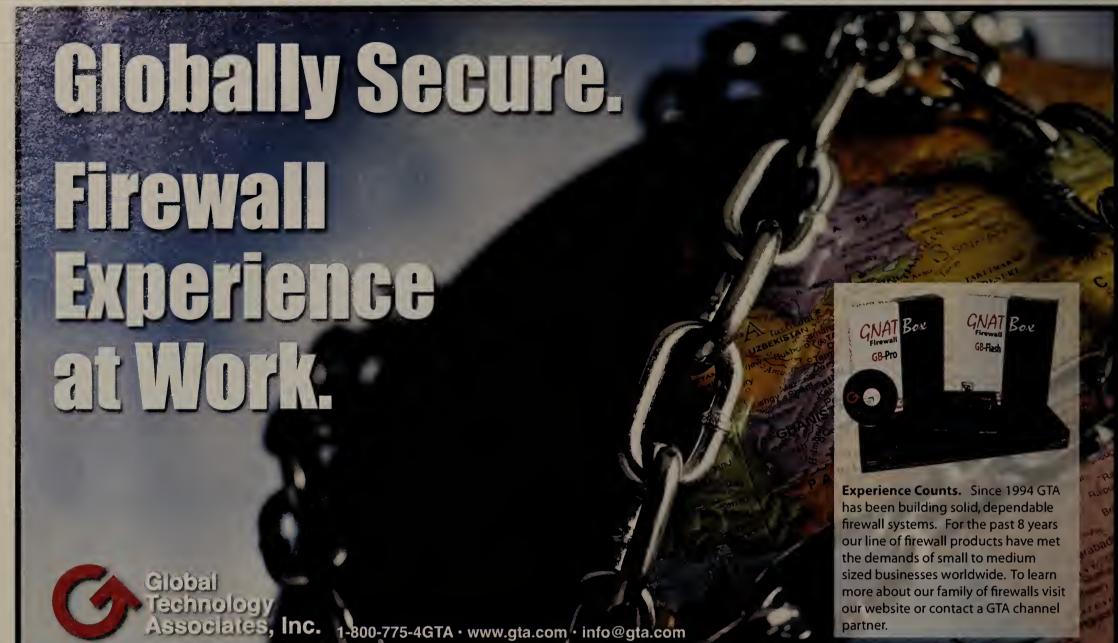
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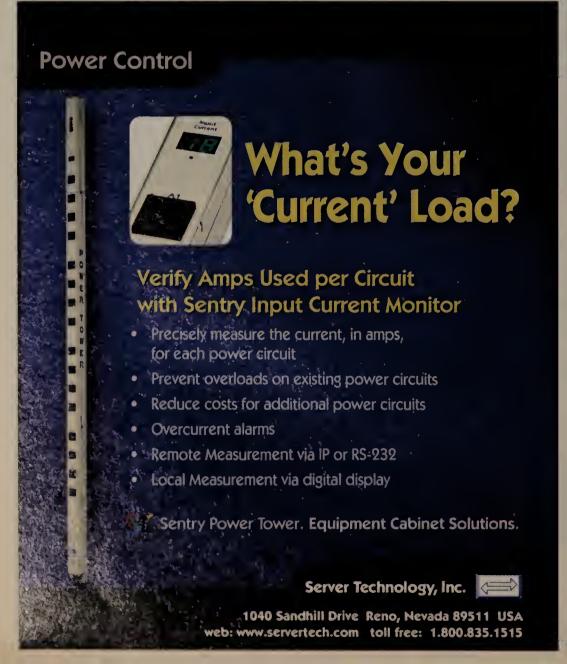
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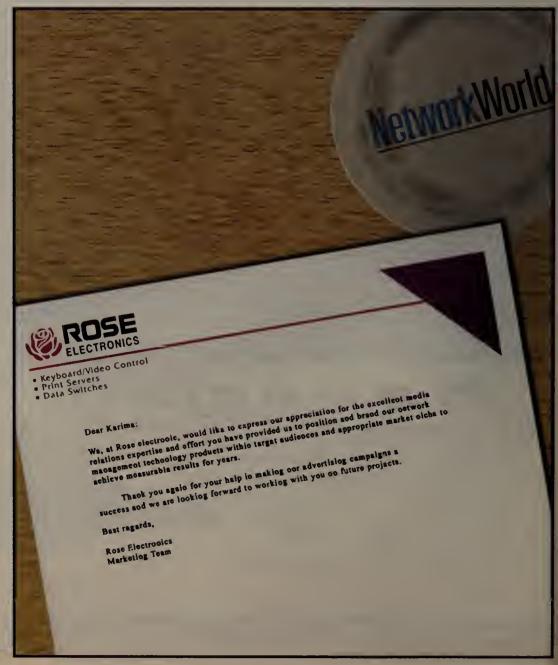
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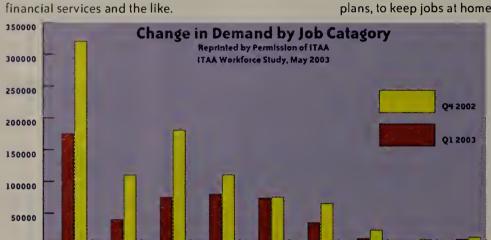
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ully nine of every 10 information technology professionals works for a non-IT company, marking a significant shift of IT workers from software development and consulting firms to more traditional business operations – manufacturing, health care, financial services and the like.



It's a much different picture than in the year 2000 when the hot jobs were found within the IT industry. Today, the more stable situation lies with non-IT companies. And the jobs to target are those in the areas of database management and administration, security and technical support.

According to the ITAA workforce development study released in May, more than 10 million people work as IT professionals. The report indicates that IT companies are more likely to use off-shore IT resources for projects, and non-IT companies are more likely to stick to hiring plans, to keep jobs at home and are likely to follow cor-

porate-wide compensation plans. The report also found that downsizing has slowed, with hiring slightly outweighing layoffs for the past two quarters.

More than 400 hiring managers responding to ITAA's survey reported that while demand for IT workers continues to fall, they plan to hire better than 490,000 IT workers in 2003. Despite a real tumble since 2002, tech support as a category

continues to employ the most IT workers, primarily to improve and fully capitalize on systems supporting non-IT business strategy. The number of web development positions also took a dive, while database development/administration and enterprise systems positions remained relatively steady.

What's driving the hiring? Planned investment to improve operations. The federal government is driving hiring in cyber-security, for agencies ranging from the Department of Homeland Security to the Department of Agriculture. While most every federal agency is looking for IT professionals, so too is the Department of Defense in its recruitment of uniformed personnel to man the varied high tech systems being used in peacekeeping and warfighting. While the telecom industry is far from a recovery, Sprint is driving a trend toward next-generation technology with the announcement of a multi-billion dollar investment to support a 12-year plan for new technologies.

Companies such as IBM, HP, Dell and Oracle also continue to drive hiring as they provide on-demand computing services to their clients.

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COMPUTER PROGRAMMER to design, develop and maintain computer programs for current Enterprise Project Management Software System(EPMS) using Java, JSP, XML, Oracle 9i, and ASP; develop interfaces to access Primavera Expedition project/contract control subsystem and P3e scheduling subsystem; program and maintain Web-based on-line rivoice systemandWeb portal appliations. tems and two years of experience competitive salary and benefits apply with resume to: Regiona lanager, 4U Services, Inc., 5293 lightway, 78, Suite, D. 222, Stoppe nway 78, Suite D-223, Stone untain, GA 30087

Database Design Analyst sought by Kiretsu Technology, Inc., S/ware Consulting Co., for position in Pembroke Pines, FL.. Must have BS & 4 years s/ware dvlpmt exp. Respond by resume to Kiretsu Technology Inc., 8362 Pines Blvd. Suite 303, Pembroke Pines, FL 33024, Attn: Lonnie Spears.

Programmer Analyst wanted by private label specialty retailer in Warrendale, PA. Must have a Bachelor's Degree or foreign uiv. degree in IT or related an 3 years exp. in job offered or in database and software applica ian development. Experience PL/SQL, SQL*PLUS Commands PRO*C, UNIX Shell Script, VE COM, and Visual C++ languages NT and UNIX Operating Systems Shawna Lemke, HR, Americar Eagle Outfitters, Inc., 150 Thorr

rogrammer Analyst required by comp Software Dvlpmt Co Bach & 2 yrs exp to dsgn, dvlp maintain & implmt Oracle d/base, Forms & Reports. Dsgr Client Server based systems using HTML/DHTML & Oracle Perform data modeling using Designer 2000. Write procedures & triggers on databased in Forms & Reports using PL/SQL Job to be performed a Wilmington, DE & various unan tricipated client sites throughout the US as assigned. Resume to: Trinet Sol., Inc. P.M.B. #5534, 2711 Centerville Rd, Ste 120, Wilmington, DE 19808.

Seeking qualified applicants for the following positions in Memphis, TN: Technical Advisor/Scientific Programmer. Provide technical advice, and expertise for real time or batch scientific programming systems/applications. Requirements: Bachelor's degree or equivalent in computer science, operations research, mathematics, statistics or related quantitative discipline plus 7 years of experience in systems development, including 2 in scientific environment. Experience with ArcGIS and Visual Basic also required. "Master's degree in appropriate field will offset 2 years of general (non-scientific) experience. Submit resumes to Chris Holliday, Federal Express Corporation, 3680 Hacks Cross Road, Bldg H, 2nd Floor, Memphis, TN 38125. EOE M/F/D/V.

Database Administrator Analyst for banking s/ware applics co. in Miami, FL Reqmts: Bach or equiv in Business Admin, 4 vrs exp in job offd or 4 yrs exp as Database Analyst/Business Analyst in related industry Will consider applicants w/any suitable combo of education, training or exp. Respond to Sally Herrick, HR Director, ERAS JV, 13501 SW 128th St, Ste 117, Miami, FL 33186.

Programmer Analyst needed w/exp in web & Windows applications using DHTML (Javascript & VBScript), ASP, JSP, Webconnect, XML, VB, VFP, SQL server, Oracle, IIS & Apache. Design & develop reports using Crystal Reports. Develop WAP applications using WML. Send resumes to Vedas, 23 Crosby Dr., Bedford, MA-01730.

BYSoft, Inc. (Houston, TX) is seek ing Software Engineers with exp. In using OpenGL, VC++, MFC, VB, XML, X/Motif, COM/DCOM, and OOP on UNIX/Linux, Window 77036, 713-776-1111(T) or info@

Seismic Micro-Technology, Inc. (Houston, TX) is seeking a Software Tester to test geosciences software. 1 yr. exp. in seismic interpretation using geosciences software. Send resume to 8584 Katy Fwy, #400. Houston, TX 77024 Attn: Manager of HR or 713-464-6440(F).

Web Product Analyst II

DUTIES Consult on system design, utilization, & availability of web based products & technologies for credit card processing systems, act as a liaison between system experts & the client; ensure methodology is followed & standards are met while tracking all projects & maintaining appropriate documentation; lead clients & TSYS entities through life cycle implementation, enhancement, & customization projects. Develop functional requirements & specifications; use cases & process flows for each project; assist in developing new products ments & specifications, das cash-& process flows for each project assist in developing new product: & enhancements; manages project plans in coordination w/ othe TSYS entities including technology operations, & messaging services.

REQUIREMENTS: Bachelor or equiv. in Business Administration, Information Systems, Network Engineering, or Computer Science + total of (5) years experience in credit card or financial services of which/including (2) years of experience w/ TSYS processes, system support, and project management. Must have legal authority to work in the U.S. Please send resume demonstrating all minimum requiredemonstrating all minimum require-ments to: Kerri Alexander, 1696 1st Ave., Columbus, GA 31902. Ref # WPA/PA.

Sr SW Eng for wireless telecom co in Redmond, WA. Duties inc complex analyses re dsgr dvlpmt & impl SW for wireless telecom products & services degroom products a services, dsgn & dvlp embedded real-time SW systems w/SW project teams & HW product dvlprs for wireless telecom & networking products & apps; impl SW systems; dvlpg SW reqs & prep detailed dsgn docs; & consult w/customers re reqs, dsgn & impl of SW systems. Job reqs incl 3G wireless comm stds (CDMA, GSM) & networking stds (TCP/IP, Internet RFCs); proficient w/ C/C++, assembler, CVS, Windows, VxWorks & Nucleus RTOS, JTAG debuggers, ARM dvlpmt tools, Gnu CC, gdb, Visual C++ & exp w/MIPS, ARM & M68K, embedded targets. Reqs: BS (or equiv) in Eng or related field. 10 yrs exp in job offd or 10 yrs exp in dvlpg dsgn & dvlp embedded real-tim in job offd or 10 yrs exp in dylpg wireless apps. Respond to HR Mgr, Elektrobit Inc, 11121 Willows Rd NE, Ste 200, Redmond WA 98052.

APPLICATION SYSTEMS ARCHITECT Responsible for application systems design, balancing optimization of application access with resource use factors. Design and construct application systems and develop requirements and design specification for new and existing applications. Create, revise and maintain document requirements for data, workflow, logical processes, hardware and operating system environment, interfaces with other systems, internal and external checks and controls, and outputs. Require: Bachelor's degree in Computer Science, Engineering, or a closely related field, with 4 years of experience in the job offered or as a Software Programmer/Consultant, Experience must include 2 years of application systems design experience using Visual Basic and SQL Servers; Send resume to: Recruiter - Human Resources, AgFirst Farm Credit Bank, P.O. Box 1499, Columbia, SC 29202. (No Phone Calls Please).

PROGRAMMER ANALYSTS for Chicago, IL office. Design & Develop software applica-tions using C++, Oracle Sybase, XML, UML, Coolger Interwoven, ClearCase Clear-Quest, Plumtree, ITS PVCS, UNIX. Bachelors reg'o in Computers, Engineering of related field of study +2 yrs related exp. 40 hrs/wk. Must have legal authority to work permanently in the U.S. Contact HR Manager, Stellar Software Network, Inc., 3601 Estacado Ln, Plano TX 75025.

Software Engineer: Develop and maintain software for a web load testing product that helps Web sites to improve quality and per formance of service they provide to their customers. Research and develop multi-threaded load agent technologies in a distrib-uted software system. Work with QA and product support to iden-tify and correct defects. Work with engineering team to brainstorm and test new ideas. Investigate and assess emerging web and software technolog level designs and implemen them in code. Provide software performance analysis of load igent technologies and Web pplications. Program in Visua Basic, Java, Microsoft SQL Ser ver, XML, Visual C++, COM, DCOM. Design complex products in a Windows environment and use object-oriented skills to develop products. Requirements include a Master's degree or equivalent in Computer Science or closely related field and one year of work experience in the job offered or related field of software engineering using Java object-oriented design
Applicants must have unrestricted authorization to work in the United States. Salary \$82,400/year. 40 hours/ wk. Respond with two copies of resume to Case #200202025, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA

Senior Software Engineer-Lead and/or participate in specification, design, development and support of products including overall architecture, componer interfaces and communication schemas; client and server-side programs using Java, C++ based product API's; Oracle SQL Server and LDAP databases schemas. Assist with develop ment of project plans and sched-ules. Follow rigorous software engineering standards including developing product require-ments, functional and design specifications and adhering to coding standards. Create ne and procedures e the develop enhance development process. Lead efforts to identify and resolve any product perfor-mance issues. Mentor junior engineers. Requirements notude a Bachelor's degree of equivalent in Computer Science Information Systems or related field and three years of work experience in the job affered ar related field of software engi-neering. Applicants must have unrestricted authorization to work in the United States. Salary \$86,000/year. 40 hours/wk. Respond with two copies of resume to Case #200202319, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA

enior Software Engineer. Engineers new client-server apps using latest desktop, web & database lechnologies & Windows platform tools. Models incl. earthquakes tomadoes, hurricanes, floods; in corp. numerical simulation peri intensity at sites in area of interest Uses numerical analysis, subst cientific & computer s/w de knowl, to ensure products quality Salary \$76K, 40 hrs/wk. Min. req BS Physics, Math, Computers of related; 2 yrs exp. in s/w dev, inter net tech. & systems integration Spec. req: numerical analysis Microsoft Visual C++, SQL Serve Microsoft Visual C++, SQL Server, ISAPI programming, multithreaded s/w programming. Winsock & Berkeley Sockets and Client/ Server programming. Submit 2 copies resume to Case # 200202092, Labor Exchange Office, 19 Stanitord St, 1st. fl., Boston, MA 02114.

Snr Software Engineer/Develop er to design, develop, test & maintain applications to support a omplex Global Reference Data ase System w/in a multination mutual fund environment. The database is at the hub of a critical rading environment with data dis ributed internally to multiple fur accounting, equity trading sys tem, decision-support & info man agement applications. Will create populate & maintain this data pase that incorporates soun business rules including referer tial integrity, data scrubbing auditing & data verification. Wi also provide application & pro duction support to end-users Requires Bach or equiv in CSc Technology, Eng, Math or Physic plus 3 ys experience in job of fered, OR 3 ys developing appli-cations in an AS/400 environ-ment. Candidate must also pos-ment also posexperience in job of sess demonstrated expertise in design & development of B2B applications using IBM Web-sphere Application Server on IBM iSeries System; dem expertise developing B2B applications or ATG Dynamo 5.1 using Dynamo Application Server & Dynamo Commerce Server & dem exper-tise developing & tuning DB2 UDB & Oracle SQL Stored Pro-cedures using SPL & PL SQL Sal: \$76,000/yr, M-F, 9A-5P, Send 2 resumes to Case #200201101 Labor Exchange Office, 19 Staniford Street, 1st fl., Boston MA 02114. EOE. Applicants be workers eligible to accept full ime employment in U.S

Design Engineer: Develop and deploy custom software applications that enhance the productivity and communication of th ompany's engineers, the gath ering of user requirements. ne design and development overb-based applications for solv ing engineering and information systems problems. Develop applications in a multi-tiered environment that utilize state-o the-art technologies such object-oriented internet p gramming and relational data-bases. Use Oracle Database administration, PL/SQL script-ing, DB2, DB2 EEE, SQL Servet Administration, Perl scripting Winrunner, Unix System administration, HTML, ASP, and Veritas Volume Manager Support databases in storage array environment. Requirements include a Master's degree or equivalent in Computer Science, Electrical Engineering or closely related field and three years of work expenence in the job offered or related field o oftware development. Appli cants must have unrestricted authorization to work in the United States. Salary \$75,000/year. 40 hours/wk. Respond with two copies of resume to Case #200202161, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA 02114.

Downtown Law Firm seeks Computer Hardware Technician (evening shift) to perform hardvare & software maintenar configuration (TCP/IP, N NFS, DNS) & operations for a broad range of applics running on Unix HP-UX & Windows Perform daily & monthly production processing & backups using tar, Cpio, Omnibak II, Unix System Administration (kerne configurations, file system structure, Raid, user & process ma agement, programming/script-ing). Maintain PC based sys-tems including MS Office trou-bleshooting. BS in Comp Info Sci or Comp Engg w/relevant work exp. regd. Send resume to Admin, Personnel, Cleary Gottlieb, Steen & Hamilton, One Liberty Plaza, NY, NY 10006

Senior Database Administrator Responsible for assigned data base application and for accept ing on database managemer system acquisitions, performing or checking sizing results, ac quiring requisite system software and system/storage devices performing data change control nstalling and upgrading data base software, implem nedium to large size production test and staging databases Maintain a dictionary or reposito ry. Assist operations staff in the setup of the required operations environment for running the sys em. Assist in the provision agreed service levels to the use business, monitoring the system (deriving statistics for usage, per formance, problems, utilization etc). Ensure integrity of data in the database per defined data base constraints and help to maintain and define such con straints with active participatio from development groups. Ad in development project. Analyza ssues and make decision Work on non-standard problem or issues and create and docu ment solutions. Administer and implement security integrity controls. Follow and adhere to pali cies, procedures and standards elating to database manage ment. Use knowledge of Oracle Unix, WindowsNT/2000/98, and Internet Security. Requirements include a Bachelor's degree o equivalent in Computer Science Electronics Engineering or close ly related Engineering field and six years of work experience in the job offered or related field of Oracle database administration Applicants must have unrestrict ed authorization to work in the United States. Salary \$82,000 vear, 40 hours/wk. Respond with two copies of resume to Case #200202599, Labor Exchange Office, 19 Staniford St., 1st Fl. Boston, MA 02114.

Kanbay is a premier glabal systems integrator that provides high-quality, high-value solutions to the insurance, banking, credit card, consumer lending and securities industries. We provide a camplete life-cycle of services including program monagement, business onolysis, technalogy planning, architecture, application development, maintenance and support. Our speciolized services include business intelligence, package selection, customizatian, implementation and testing. The following apportunities ore based at our corporate headquarters in Chicoga and locations nationwide. We are seeking candidates with technical skills in: JAVA, J2EE, OOAD, WebSphere, XML, .Net, COBOL, CICS, DB2, JCL, and VisianPlus expertise in an MVS environment.

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- schedules.

 Senior Programmer Analysts:
 Will analyze client needs, evaluate existing software, gather requirements, and help design the specs along with taking part in customization of soft-
- ware.
 Developers: Will code, help customize software and will perform unit testing.

Requirements: All positions require BS in Comp. Science or its equivalent with more than 3 years of over-lill IT Experience. All positions will require experience in one of Business Objects, Cognos, Informatica, Oracle Express, Siebel, Tibco or in WebMethods with expenence in allied Internet technologies.

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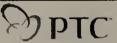
Send resumes to Rona Troff, 300 N Dakota Ave. Suite #505-B, Sioux Falls, SD 57104 or email rtroff@ tnscinc.com Fax: 530-733-2775.

Senior Software Engineer: Lead and participate in specification, design, development and sup-port of Internet Security prodport of Internet Security prod-ucts, including overall architec-ture, component interfaces, and communication schemas; client and server-side programs using Java, XML and C++ on both Windows and Unix; Java and C++ based product APIs; Oracle, SQLServer and LDAP database schemas. Internation-alize software and globalize lize software and globalize roduct. Develop produc equirements, functional and lesign specifications and adher ing to coding standards. Leac efforts to identify and resolve any product performance issues. Requirements include a Issues. Requirements include a Master's degree or equivalent in Computer Science, an Engineering discipline or closely related field and two years of experience in the job offered or related field of software development/engineering. Applicants must have unrestricted authorization to work in the United States. Salary \$78,000 /year. 40 hours/wk. Respond with two copies of resume to Case #200202158, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA 02114.

SYSTEMS ANALYST (2 Positions)

once mgmt., inventory scanning, stock status database & related components. Using Cool Gen, VAG, COBOL, DB2, CICS, JCL & client/server techs., write specs for system modifications, partici-pate in tech. design of systems enhancements & develop, test, & enhancements & develop, test, & implement app. code. Eval. structure & flow of data through assigned systems. Implement system changes & enhancements wisupport for continuing systems maint Make on-line & batch system changes, as well as write & execute test plans & data. Eval. Structure, & flow of data to deterexecute test pians & data. Eval structure & flow of data to determine results, sources & structure for data & file org for optimal system usage. Requires. B.S. (or foreign equiv.) in Comp. Sci., Math, Engn., or related field & 2 yrs exp. so Systems Analyst, Prog. Analyst, or Prog. EOE. 40 hrs/wk. Send resume to Kim Richitelli, Belk Stores Services, Inc., 2801. W. Tyvola Rd., Charlotte, NC 28217.

Senior Developer-Perform life cycle web-based application de cycle web-based application de-velopment including turning busi-ness requirements into system specifications, designing data-base schemas, creating middle tier components, creating user in-terface, and implementing appli-cations using the latest client server and web technologies. Design and develop robust secu nty infrastructures to support the Windows-based application to achieve fine-grained functional and data security requirements. Research and recommend new network, application and web security method and implemen these methods in related projects Communicate the end-user feed back to the project leadership fo action. Correct problems, modifi or enhance programs and sof support the application rollout a various customer sites. Use knowledge of MS SQL Server 2000. Requirements include a Master's Degree or equivalent in Computer Science, an Engineer-ing discipline or related field and at least three years of pre-or post degree work experience in the jot offered or related field of software cants must have unrestricte cants must have unrestricted authorization to work in the United States. Salary \$85,561/year. 40 hours/wk. Respond with two copies of resume to Case #200201803, Labor Exchange Office, 19 Staniford St., 1st Fl., Poston, MA 0.2114. Boston, MA 02114.



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Senior Implementation

Senior Implementation
Consultants (BS degree plus
two years' experience in PDM
consulting or PDM development or a MS degree and no
experience)

Senior Software Engineers
(BS degree plus one year
experience in software development and expertise programming in Java and HTML
or a MS degree and no experience and expertise programming in Java and HTML)

Please send resume to: Diane Radula PTC Human Resources 140 Kendrick Street Needham, MA 02494 or email to drrecrulting@ptc.com

PROGRAMMER ANALYSTS for Chicago, IL office. Desig & Develop software applica tions using C++, Oracle, Sybase, XML, Coolgen, Interwoven, ClearCase, ClearQuest, Plumtree, ITS, PVCS, UNIX Bachelors reg'd in Computers, Engineering or related field of study +2 yrs of related exp. 40 hrs/wk. Must have legal authority to work permanently in the U.S. Contact HR Manager, Regency Technologies, Inc., 1100 Airport Freeway, Suite 204, Bedford, TX 76021.

Developer sought by oncology/ therapeutics div. of pharma R&D co. in San Francisco, CA. must Bachelor's degree or equiv. in Computer Engineering or relat-ed. Min. of 5 years experience in application development & data-base design & development on Oracle platform required Extensive exp. in OOAD, Object Oriented Programming, DBA database design tools, data modeling tools (ERWin), SQL, PL/SQL, Unix (shellscripts, FTP automation), Java, Oracle 8i database, Oracle 11i applica-tions (order fulfillment), Blue Martini CRM and HTML, phar ma. pricing s/w customization required. Experience in phar ma, pricing required. Must have strong analytical skills in pricing infrastructure, information serrices & data analyses, & excelent oral & written communication skills. Send resumes to: OTN, Staffing Dept., 395 Oyster Point Blvd., Suite 405, South San Francisco, CA 94080, Job Code: VM-764 or fax resume to

Internet Commercial Artist will design arts/visual graphics for product ads in Internet shopping sites with following duties: re-search on products/services and formulate concept art design/ layout using freehand drawing scratch layout; create sketches for clients review using PhotoShop, EasyPhoto, Print Shop, PhotoImpact and Corel-Draw7; design animation graphics with Flash5 and WGT; pre-pare digitized drawings/pictures and complete final layout for JavaScript, Namo WebEditor5 consult with corporate clients to provide artistic suggestions. Requires BA/BS in Fine Arts Studio Arts, or Graphic Design ng and must be able to perform ing. Full_time/competitive salary Resume_to: HR. Compute Resume to: HR, Computer Concepts, Inc. 11654 Dorsett Rd., St. Louis, MO 63043. No call/EOE.

SYSTEMS ANALYST to pro vide on-site consultancy to analyze, design, develop, im plement and modify e-com-merce applications using Java, Java Servlets, J2EE, DHTML, HTML, VC++, C/C++, VB-Script, XML, HTTP, TCP/IP, JSP, EJB, ASP, Oracle, Sybase, SQL Server and related base, SQL Server and related tools in Unix, Windows and Real-time NT environment. Require: B.S. in Computer Science/Engineering and two years experience in the job offered. 25% paid travel required to client sites within the quired to client sites within the United States. Competitive United States. Competitive salary and benefits. Apply with resume to: Vice President, Compucom Global Solutions. Inc., 200 Perrine Road, S 225, Old Bridge, NJ 08857

Seeking qualified applicants for the following positions in Memphis/ Collierville, TN. Senior Programmer Analyst, Formulate/define functional requirements and documentation assed on accepted user criteria. Requirements: Bachelor's degree in computer science, MIS, information technology, engineering or related field plus 5 years of experience in systems/applications development Experience with Java; either C or C++, and development of transactional distributed systems/applications also required. "Master's degree in appropriate field will offset 2 years of general experience. Submit resumes to Sibi George, FedEx Corporate experience. Submit resumes to Sibi George, FedEx Corporate Services, 1900 Summit Tower Blvd., Suite 1400, Orlando, FL 32810 EOE M/F/D/V

Network Administrator I: Entry-level position to install & support company LAN, WAN, Internet system. Develop company graphic & animation website, coordinate & implement networ coordinate & implement network security measures. Req. Bachelor's in C.S. or any computer related field. No exp. req. but must demonstrate ability to perform job through course worl or project involving C, C++ graphic & animation program ming. Resume w/ transcripts to Pres., Color Imaging Inc., 4350 Peachtree Industrial Blvd., Ste 100, Norcross, GA 30071

Computer Programmer: Deve lop, design, analyze & test J2EE applications using JSP, Servlets, JDBC, Oracle, PL/SQL, HTML, Java Script & Weblogic
Application Server. Develop software applications using Signed applets & RMI. Req Bachelor's or its foreign dgr Equvl't in C.S. or other related engineering field + 2yr exp. ir either job offered or Software Engineering or computer pro Resume Softech Resources, Inc., 3300 Holcomb Bridge Rd., Ste 270, Norcross

ENGINEERING

ENGINEERING

Leading energy services provider seeks Systems Integration Engineer. BS or equiv in CS, Electronics Engrng, Instrumentation Engrng or related. Must have 5 yrs exp design of control systems that includes 3 yrs exp middle ware, enterprise resource planning or database resource planning or database resource planning or database resource planning or database resource planning or energy mgmt control systems with sw producols; 6 mos exp systems integration, web based data acquisition and programming of BMS integration protocols; knowledge C++, Java, SQL/Oracle database. Job location: White Plains, NY, Fax resume w/cover to attn: HR DeptEIS at (914) 448-0057.

Network Administrator. Trouble-shoot services, connections, installations; roll out & monitor pro stallations; roll out a monitor production systems; maintain utilities w/client applications; database admin.; maintain security of systems (data) share responsibility w tems/data; share responsibility value administrators for 24/7 operating administrators for 2417 operating systems, network connectivity system services (citrix servers etc.). Must have Bachelor's in Comp. Sci., Engg. or related, 1 yr exp., & knowledge of SQL database admin.; NT/2000 systems pase admin.; NT/2000 systems admin.; network mgmt., Citrix; IIS; Firewalls; Security. Send resume to Steve Alderfer, HRSoft, LLC, 505 N 4th St., Fairfield IA 52556.

Computers - Sr. Technica Consultants needed. Seek ing qual, candidates poss essing MS or equiv. and/or relevant work exp. Part of the req. relevant work exp. mus include 2 yrs. working with Rational Rose, C++ & Open Market Transact. Experience with WebSphere preferred. Mail resume & ref. to: Object Solutions, Inc., Attn: HR, 3025 Harbor Lane, #312 Plymouth, MN, 55447-5119. Please refer to "STC" in your

Programmers, Jr. Programmers Software Engineers: Analyze design and develop apps. in (a) MQ Series, Shell Scripts, Java and related tech., Oracle & relatand related tech., Oracle & related tools, SQL Loader, CGI/Perl, Visual Basic, AppWorx and related technologies; (b) C/C++, Cobol, PB, Sybase, Java, Oracle, SQL Server, XML, Unix, MQ Series, Weblogic and related technologies. US Workers only. Consulting positions requiring travel. Prevailing wage/benefits. Send resume to HR, Datum America Ltd., 850 Boyce Rd., Suite 7, Bridgeville, PA 15017. EOE.

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is huge because you can add mechanisms like security and encryption incrementally, but that means you have to parse the message to pull out the data. It's a huge amount of overhead."

Schadler says dedicated network hardware will become a requirement for successful XML and Web services adoption and eventually will help define a layer in networks committed to XML.

The evolution is not surprising because many CPU-intensive tasks in the past have been moved from software to dedicated hardware.

Some vendors are rising to the XML challenge with general-purpose products and others have focused on specific tasks such as security or transformation. Early adopters say XML processing inevitably will move from application server software to hardware.

Earlier this month, Sarvega, which develops a hardware accelerator called XPE 2000, received an additional \$10 million in venture funding. Other players such as DataPower - with founder and CTO Eugene Kuznetsov - are stocked with industry veterans from companies such as Cisco and Nortel. Other vendors include Forum Systems, Reactivity and Westbridge.

Also, start-ups such as Conform-

ative Systems, which received \$6.5 million in venture backing this month, are emerging from stealth mode and plan to introduce products next year. And nearly a half dozen other startups are currently flying under the radar, analysts say.

Intel spinoff Tarari this month is scheduled to release its first XML Content Processor, a siliconbased XML processing engine on a PCI card that plugs into servers, appliances or network devices.

Analysts say established hardware vendors such as Cisco, F5 Networks and Nortel will incorporate some type of acceleration technology over the coming

"We don't have to solve this problem today, but we are keeping an eye on it," says Mike Paratore, product line manager for content switches at Cisco.

These network devices sit behind a firewall and form an aggregation point for XML traffic on the wire. They parse XML messages, validate integrity and security attributes, transform data formats and route messages.

"In the Web services model, XML acceleration becomes a necessity," says Jeff Lamb, CTO for Leader Technologies, which runs LeaderPhone.com Webbased teleconferencing service.

Lamb uses Extensible Stylesheet Language Transformations to render interfaces to the

LeaderPhone Web site that are appropriate for a user's connection speed and device.

"We could not have done this without acceleration hardware," says Lamb, who uses an XA35 XML Accelerator from DataPower. "The complex transformations were bogging down our application server, which made the user experience much too slow." Lamb was using a common parsing engine from Apache called Xerces on the application server.

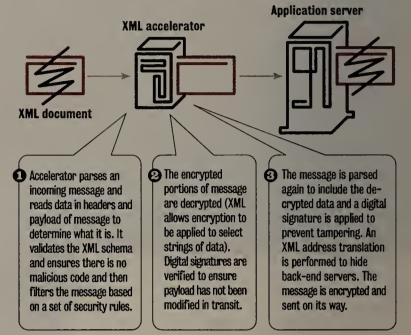
Lamb's experience is likely to become the norm. Research firm ZapThink says XML is expected to account for more than 25% of network traffic by 2006, up from just under 2% today. And Forrester says 1 billion clients will be sending and receiving XML messages based on the Simple Object Access Protocol by 2008.

"XML gives us the next level for data delivery and that will drive the need for acceleration," says Chandru Bolaki, director for research and development at UTStarcom, which develops network gear for service providers. Bolaki has run a Sarvega XPE accelerator for two years to inject user data into his call center.

"The first issue is always ease of use. HTML is a good example. When it first started out, there was no concern about handling the volume. But as people found out how easy it was to use, it exploded and that's why you have compaHOW IT WORKS

Processing XML

An XML accelerator processes an XML message, which contains validation, transformation and routing. Here is a look at the processing needed to determine the security that is contained within a message.



SOURCE: NETWORK WORLD, DATAPOWER

nies like Akamai [which caches content]," Bolaki says.

In addition to streamlining the use of XML, acceleration hardware will give users an idea of what it will take to design a service-oriented architecture, a network that can accommodate a collection of loosely connected, reusable Web services components that can be stitched into applications.

Once the data-center folks see all the Web services traffic on the network they will want bottleneck issues solved," says Ron Schmelzer, an analyst with ZapThink.

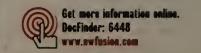
DataPower CTO Kuznetsov, who's worked on XML acceleration for four years, says a major shift is coming in the kinds of duties delegated to network gear.

"You are not going to want some shim software on a general-purpose server sitting in line with data-center traffic," Kuznetsov says. DataPower's XA35 XML accelerator and XS40 XML Security Gateway are true network devices, as opposed to another class of acceleration products that use hard drives in their boxes.

Regardless of design, vendors say the bottom line is savings in cost and performance.

"What we are talking about is millions of dollars in savings by moving to better throughput, better response and a more effective way to scale," says John Chirapurath, co-founder and vice president of marketing for Sarvega. "The alternative is to throw more Unix or Windows boxes at the problem in order to scale up.

"An evolution in applications has always caused a revolution in networks. And that is no different here."



Start-up touts application integration in an appliance

tart-up Cast Iron Systems is putting a new twist on application integration with an appliance that will live and function on corporate networks.

The company is expected to emerge from stealth mode early next month to launch its Application Router 1000. The router is a light weight rendition of enterprise application integration (EAI) software and lets companies integrate applications regardless of data format either internally or with business partners.

The difference is that Cast Iron does everything on a device. Companies use a set of design tools to map connections between applications and then deploy in their data centers the rack-mounted router, which handles protocol and data format conversion using XML and C++ to optimize performance, workflow and light weight routing. The router also includes a management console.

"Cast Iron handles stuff at the edge where EAI would be overkill," says Greg Kleiner, infrastructure analyst for Soundview Technology Group, an investment firm. "If you are hooking the shop floor to IT you don't need a full-blown Tibco platform. You want a box you can plug applications into, connect to the core of your network and remotely manage from your data center."

The simplicity of Application Router is its selling point, according the Pat Lawrence, CIO for Prime Source Food Service Equipment. Plane Source has about 700 vendors it must integrate with to prchase orders, billing information and shipping data. Promps that was done with faxes or phone calls.

Lawrence has deployed Application Router 1000 to handle the exchange of purchase orders; acknowledgments of purchases including ship date; and acknowledgments of shipping, including a bill of lading and tracking information. Lawrence plans to add sup-

"The beauty of the router is that we don't have the clout to tell these vendors we are going to use [electronic data interchange], and they have to comply," Lawrence says. "This allows us to easily communicate in whatever format the vendor chooses without having to write custom interfaces for each partner."

Cast Iron co-founder and CEO Fred Meyer, who was formerly the chief strategy officer at Tibco, says, "We are not trying to be EAIlike. We are tying to dumb that down."

Meyer says just like routers were designed to help connect networks running different protocols, Cast Iron is helping connect applications with different protocols and data formats.

The appliance runs on an enhanced version of Linux and has two 10/100/1000Base-T data ports and one 10/100/1000Base-T management port. The device supports custom integration but ships with support for ERP systems including SAP and PeopleSoft. It also supports SQL, Structured Text, XML documents and MIME, and includes pre-configured templates for EDI.

The router is priced between \$30,000 and \$100,000, depending on configuration.

- John Fontana



Storage

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WLAN

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evaluate a new approach to largescale WLAN deployment: the socalled wireless switch, the first of which are starting to ship.

But none of these tools can or will replace the need to first think big about WLAN management. Experts say to control a big WLAN and minimize operational problems, you have to think through the issues from top to bottom.

Enterprise WLANs are almost invisible to a traditional network management system, even as they add hundreds or thousands of end devices that need to be managed. As Bernstein notes, hiring a platoon of support technicians to hike around a sprawling deployment and fiddle with access points is not practical.

Nearly all of the biggest WLAN sites are using a blend of homegrown tools and third-party applications.

Many WLAN hardware vendors create SNMP management information bases (MIB) on their access points. MIBs are chunks of code that use SNMP to pass data about the device's behavior and health to network management applications, where the data can be analyzed. MIBs written by vendors can pass back sketchy information about highly detailed data. And getting to the data, getting it out and getting it stored is a pain.

"Today, I have to go out and poll 560 access points," says Brad Noblet, director of technical services at Dartmouth College in Hanover, N.H. "That's time-consuming and bandwidth-consuming."

Cisco's internal IT group, overseeing about 3,000 access points in the company's global wireless network, has used some Cisco management tools, but they rely mainly on a set of applications they wrote themselves.

"I will use those tools if they offer me something [I need]," says David Castaneda, member of the technical staff with Cisco's Infrastructure IT group. "If they don't, I will build what I need."

What they built was their own wireless network provisioning tools, which typically run at night under the direction of Cisco-written scripts. Triggered by the scripts, the programs update the software on every access point in the network. That update is simplified because Cisco decided that the exact same software load, or image, would run on each device. The payoff is a network

"That just doesn't scale:" Help desk support

The problem: Handling calls from wireless users reporting problems.

The big problem: Microsoft's internal help desk fields 700 wireless-related calls per month.

The think-small solution: Give current help staff additional documentation on WLANs; rely on the theory of management by busy signal.

The think-big solution: Set user expectations, create Web site for self-service on simple problems, escalate wireless problems to wireless-trained staff, divide responsibility between help-desk and network operations staffs.

that almost seems to run itself, according to Castaneda.

"Our wireless LAN is very nonlabor intensive," he says. "We wanted an 'install-and-forget' scenario, and that is what we built."

Many routine chores on distributed access points still have to be done one at a time. Network managers have turned to do-it-yourself automation to make this feasible for networks such as the one emerging at McGill. One example is changing the service set identifier (SSID) on each access point. The SSID is attached to wireless packets and acts as a kind of password to join a specific WLAN.

"If you want to change the SSID on all your access points, typically you still have to do this manually," says Pascal Beauregard, project manager for McGill's WLAN.

McGill created a set of Perl scripts that runs nightly to apply changes to the SSID and to collect device data using SNMP.

Designing for simplified management was a key element in Microsoft's installation of a huge WLAN at its Redmond, Wash., campus. From the outset, the company's internal IT group made sure it had remote control of the console port on each of the 2,500 access points deployed there. (See Part 1 of this series, www.nwfusion.com, DocFinder: 6444.) Then, operations staff built three databases with information on device addresses, radio channel assignments, locations and settings, and a bundle of scripts.

Installing an access point is now so simple it's handled by a building's facilities engineering staff, instead of the IT group. After the device is installed, a network administrator clicks on a script, which pulls out the needed data and configures the device.

"The script brings all this together and configures one access point or a whole subnet of access points with one button-click," says Don Berry, senior network engineer with Microsoft's Operations

and Technology Group.

A growing number of thirdparty applications are taking a similar approach.

St.Vincent's Hospital in Birmingham, Ala., manages 170 access points with Mobile Manager from WaveLink Wireless and Cisco WLAN management utilities. Until recently, such tools typically have focused on remotely managing individual access points.

By contrast, WaveLink lets St. Vincent's corral access points into groups based on criteria such as location, business department or function. Users assigned to a department, such as the outpatient clinics, inherit the access rights of that department. Network managers also can send software upgrades or configuration changes by group, instead of individually.

Crowded market

Traffic and signal monitors from companies such as AirMagnet, Sniffer Technologies and Wild-Packets are used for sweeping radio channels to identify unauthorized access points and determine signal strength

Wireless security gateway companies, such as Bluesocket, Colubris, Fortress Technologies, ReefEdge and Vernier Networks, are adding a growing array of device management features to extend centralized control over access points.

WLAN switch start-ups, such as Airespace, Aruba Wireless Networks and Vivato, are scheduled to begin shipping products over the next few months. These boxes have Layer 2 and Layer 3 switch features to aggregate access points into manageable groups. There are companion access points, and software tools for monitoring radio signals and sometimes automatically adjust the signals.

Traditional network management applications, such as HP OpenView and Computer Asso-

ciates' Unicenter, have new features, often as options, designed for managing wireless network devices and radio signals.

Customers can simplify managing large-scale WLANs by making smart design and architectural decisions at the outset, experts say. A common practice is to mandate a single software bundle, called the system image, for each access point. All access points come with software.

The single-image mandate is designed to make sure each device has the same software version, and the same standard set of configurations and settings. This makes access points easier to troubleshoot and, if necessary, replace. Remote-control capabilities and power over Ethernet can make on-site visits by support staff rare. A self-service wireless Web site can let users handle a range of questions and minor problems on their own.

Microsoft's help desk handles all client-related issues, such as new setup and public-key infrastructure problems. Problems that are infrastructure-related or affect a group of users are passed to the Global Network Operations Center. Microsoft reports there are about 700 help desk calls each month from wireless users.

The top two issues for the network operations center staff are "hung" or unresponsive access points, requiring a reboot or power off/on cycle. The replacement rate for the 3,700-odd access points so far works out to about one device every other week, or about 25 per year.

The wireless team at McGill says client-related issues are their main operational thorn. McGill had decided to use a VPN to en-

crypt wireless traffic, without the overhead of digital certificates and a private-key infrastructure. But VPNs require client code running on a laptop or PDA. McGill's wireless team found that the way the Windows operating system and the VPN interact created problems in the early stages. Installing and configuring wireless network interface cards, especially when several client operating systems have to be supported, is another source of problems.

Managing the spectrum

One of the most difficult challenges is managing the radio spectrum, because most network management tools assume the connection medium is a wire, not a radio transmission. The result is somewhat analogous to trying to adjust a satellite TV dish by yourself.

"We'd get reports [from users] that radio coverage wasn't great," Noblet says, recalling the early stage of Dartmouth's wireless rollout. "We'd go out [to the access points], jigger things around and ask users, 'ls it working now?""

Today, Dartmouth's network staff makes use of radio monitoring software from AirMagnet, and freeware applications such as NetStumbler, to get a more precise picture of coverage patterns and throughput. Other signal and traffic management tools include applications such as Wireless Valley Communications' LANPlanner, for predicting radio coverage patterns; and from Newbury Networks' WiFi Watchdog, for detecting, monitoring and pinpointing all 802.11 devices.

Radio management for big See WLAN, page 85

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Periodicals postage paid at Southborough, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #40053800. Network World (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 118 Turnpike Road, Southborough, MA 01772-9108.

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Shows

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show is banning displays of purely consumer items like games and digital cameras.

Comdex isn't the only technology show to suffer. Attendance at SuperComm, the major service provider trade show, dropped from 53,000 in 2000 to an estimated 24,000 this year. And the fall Atlanta version of Neting to deliver people likely to spend money. To do that they are developing educational conferences concurrent with the trade shows and distributing marketing materials that spell out what benefits attendees can expect. Organizers hope that people interested in serious content also will be empowered to close deals with exhibitors at the

"It's essential to present an

LE We don't have time for some white guy with a PowerPoint droning on at you for an hour with the same old crap. 77

Jack Powers

World+Interop, which in 2001 opened on Sept. 11, suffered from poor attendance the following year so Key3Media discontinued the fall N+l, keeping just the spring Las Vegas N+1.

Medialive knows more than Priest-Heck says.

Now Medialive and other trade

event that connects pre-qualified buyers and sellers in a meaningful way," says Rob Scheschareg, vice president of sales, marketing and product development for IDG World Expo, a Network World corporate cousin. The firm produces the annual ComNet show in Washington, D.C., which once boasted 50,000 attendees, was down to 30,000 this year, and the number of exhibitors was down two-thirds from two years ago.

If the new tactics don't work, the shows won't win back the big vendors that once spent lavishly to exhibit their wares.

'Shows are not a top priority'

"Trade shows are not a top priority," says Mark Straton, senior vice president of global marketing for Siemens Enterprise Networking, ICN group. The company once spent \$1.2 million on its N+I exhibit, and that didn't include the cost of travel, meals and lodging for staffers or lobster dinners and tickets to "Cirque du Soleil" for 200 customers. "I would never see us doing that again,"

Siemens didn't exhibit at this year's N+l, but deemed it worthwhile to send a team that wined and dined analysts and trade press. It is considering a return to exhibiting at the show next year. "We may do big shows but in a smaller way," Straton says.

Meanwhile, Siemens says it has found better ways to reach buyers: small, single-theme shows, technical conferences and events called Siemens Salons, which are intimate dinners with select customers. The first salon was a dinner for 20 CEOs and their spouses held recently to discuss whether technology can humanize healthcare, says Janyce Harper, events manager for Siemens.

Similarly, Avaya holds Avaya Forums, gatherings of several hundred customers and prospects to show the company's wares, talk about what it is developing and seek input, says Pete de Tagyos, Avaya's global events



vice president.

Although Avaya still attends big shows such as N+l, it tries to focus more on likely spenders.

"We invite good customers for a particular time and have tailored demonstrations for that client. We find that to be the bread and butter of it," de Tagyos says. "The people with the plastic bags picking up novelties are not what we're interested in."

He also looks to the boutique shows aimed at particular technologies such as voice over IP or call centers. "You have an awful lot of smaller shows that are very focused and that line up with our priorities," de Tagyos says.

As money got tight for exhibitors, the shows didn't respond by easing up on the price they charged for floor space, de Tagyos says. Medialive seems to have learned a lesson from that. It used to charge a fixed price per square foot no matter how much space a vendor bought. Floor space at Comdex this fall is volume priced: the more space you buy, the less it costs per square foot. Prices range from \$59.95 down to \$49.95 per square foot, says Eric Faurot, vice president and general manager of Comdex.

The show also is being organized around seven technology themes featured in innovation centers on the show floor and is backed up by theme tracks in conference sessions. This is intended to help attendees navigate the show and pinpoint the technologies they are interested in.

While attendance at big shows has dropped, smaller ones have been hurt less, says Mike Colby, president of trade-show and conference promoter DCl.

"The smaller, more focused shows are not down as much or holding flat," he says. Also, because they focus on the

hottest technologies, they are expected to come and go. "We're always looking for new ideas and new shows to launch," he savs.

Despite the troubles, enterprising promoters are launching and planning major new shows. Last week CeBit America, a slimmed down version of CeBit in Hannover, Germany, opened in New York with a strict focus on IT, network and business applications. Attendance was projected to be 20,000, one-tenth of CeBit Hannover's attendance.

In November, another new show called Computer Digital Expo, or dcXpo, will take place in Las Vegas on the same dates that Comdex meets.

Jack Powers, dcXpo's Chairman, hopes Comdex is mortally wounded because it has been tagged as the big show that is shrinking. "Once you get stuck with that, it's impossible to shake it," Powers says.

He says dcXpo, launched by Jupiter Events, will have top-shelf conference sessions but intends to brighten them up with tricks that range from game-show formats to voting for smartest and dumbest speakers on a panel.

"It's less CNN and more Fox or MTV," Powers says.

"We don't have time for some white guy with a PowerPoint droning on at you for an hour with the same old crap," he adds.

The IT trade show boom followed by a bust has mirrored the high-tech industry, and so will their recovery, Colby says.

"I don't think Comdex and Interop will ever get back to where they were before. They could run those shows profitably at a lower level and as the economy upturns they will increase in size," he says.



Chairman, dcXpo

most about the harsh realities of trade shows. The bankruptcy was precipitated by hanging on too long to the theory that success meant high-attendance numbers and lots of exhibitors spending lots of money to rent floor space,

show producers are instead try-

WLANs today really begins at

the design stage, where you can

address throughput require-

ments, channel assignments for

each access points and interfer-

ence. A good design can mini-

mize radio management prob-

lems, such as those caused by

Both 802.11b and 802.11g net-

these channels, and clients use

that channel to connect to a

given access point. Those three

channels limit how many 2.4-

GHz devices can be located

"This is a [network] design

problem," says Gary Braver, prin-

cipal consultant with FastLane Networks, a WLAN integrator. "If

you have 50 users on one

[802.11b] access point, you end

up giving them about 100K

close together.

channel interference.

continued from page 84

"That just doesn't scale: "Software changes

The problem: Updating software, patches, configurations on access points.

The big problem: Making such changes on 3,000 access points.

The think-small solution: Using a Web GUI to apply changes

The think-blg solution: McGill University's IT group wrote a set of Perl scripts, which run nightly, to apply changes or collect SNMP data from the access points.

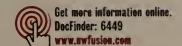
works run in the 2.4-GHz radio band, which has only three nonbit/sec of sustained throughput overlapping channels. Each acper user." cess point is assigned one of

Microsoft's IT group struggled with this initially to find a design that balanced the number of access points and performance for the buildings on the campus.

Another complicating factor is that the WLAN radio picture is changing constantly. Cisco's Infrastructure IP group has a process of continually scanning the airwaves at all WLAN sites and scanning the nets to match all media access control addresses that show up with a

database of official MAC addresses. This scanning unmasks unauthorized access points, but it also gives network operators a picture of the radio architecture.

"Because your radio architecture works one month, there's no guarantee it will work the next month," says Oisin Mac Alasdair, technical project manager with Cisco Infrastructure IT.■



BackSpin Mark Gibbs



Sen. Hatch and the record industry's jihad

"Illegally download copyright music from the Internet once, or even twice, and you get a warning. Do it a third time, and your computer gets destroyed. That's the suggestion made by the chairman [Sen. Orrin Hatch, R-Utah], of the Senate Judiciary Committee at a Tuesday

hearing on copyright abuse."

— The San Jose Mercury News, June 18, 2003

I was going to write this column as an ethically persuasive letter to Hatch about his thoughts (for want of a better word) on how to reduce copyright infringement, but the more I thought about it the clearer it became that I would be wasting my time.

The point of such a letter would have been to present an organized, cogent argument intended to get him to reconsider his position by explaining the facts. I now realize that would be pointless.

You see, the senator's position is (how can I put this nicely?) completely ignorant. It also is unethical, impractical and a breach of trust, and smacks of a politician sucking up to a rich and powerful lobby.

Yes folks, unless there is something that we don't know — such as the Recording Industry Association of America (RIAA) mafia made him say those things under the threat of torture — it looks a lot like Hatch

The senator's position is completely ignorant. . . . It smacks of a politician sucking up to a rich powerful lobby.

is about as deep a thinker as, say, Mr. Ed. Either that or the senator has simply lost his mind.

Last week at the judiciary hearing on copyright issues, Randy Saaf, CEO of MediaDefender, (described as "a secretive Los Angeles company" that has some technology to detect and slow the transfer of pirated music) commented that "No one is interested in destroying anyone's computer."

Hatch immediately interjected: "I'm interested!" and went on to say that damaging someone's computer "may be the only way you can teach somebody about copyrights."

According to the *Mercury News*, Hatch rampaged on: "If we can find some way to do this without destroying their machines, we'd be interested in hearing about that, [but if] that's the only way then I'm all for destroying their machines. If you have a few hundred thousand of those, people would real-

ize [the seriousness of their actions]."

Wow.This is the chairman of the Senate Judiciary Committee? Talk about uninformed and short-sighted. What happens when the copyright police make a mistake and toast the wrong person's system? And who will be the copyright police? And ... well, I could rant on, but you get the idea.

But what next? After that it will be a short road to, "If we catch you listening to pirated music, we'll cut your ears off" and "If you break the speed limit we'll rip your wheels off."

This sounds rather like the kind of justice meted out in places like Iran and Iraq. Wait, maybe Hatch is on some kind of jihad with the RIAAistas! That's it, Hatch is a terrorist!

Folks, something needs to be done. When we have the chairman of the judiciary committee (no less) behaving like a raving lunatic over an issue that pales compared with this country's more pressing issues, such as resolving the aftermath of the lraq war and dealing with poverty and healthcare in the U.S., something is very wrong.

You might think Hatch is grandstanding or being negligent, irresponsible, foolish or, as I implied, deranged. Whatever you think the reason is, write him (www.nwfusion.com, DocFinder: 6445) and tell him.

Yet more outrage to backspin@gibbs.com.

NetBuzz News, insights, opinions and oddities

By Paul McNamara

Soul of Kamen's new machine

Ever since all the media hoopla and fanciful speculation erupted early last

year around what we now know as the Segway Human Transporter — "that silly scooter" to skeptics — opinions have broken roughly into two camps.

In the first we find those who are fascinated by the technology and think Segway will be big, even if they don't share inventor Dean Kamen's conviction that his New Hampshire company is going to change life as we know it by bridging the gap between motorized and pedestrian travel.

In the second camp are those who *might* be fascinated if only they took the time to learn more and move beyond nearsighted brushoffs about scooters.

That's my bias, of course, being a charter member of the first group.

Both fans and naysayers will find enlightenment in a new book by Steve Kemper called Code Name Ginger: The Story Behind Segway and Dean Kamen's Quest to Invent a New World. The author enjoyed full access to the Segway inner sanctum from where he chronicles an extraordinary development story that features a supporting cast of familiar high-tech characters: Apple's Steve Jobs, Amazon's Jeff Bezos and venture capitalist John Doerr, whose depiction redefines "won't take no for an answer."

Kamen dominates, of course, and the book works best as a personality profile; second-best as a "Soul of a New Machine" type of project diary.

It's important to remember that this is a single portrait of a complex man painted by one artist. Moreover, the artist is shown the door by the subject before the work is completed (don't worry, not a deal killer). Kemper does an admirable job of providing balance to a story that could easily have veered toward hero worship or hatchet job.

We learn that the words eccentric and driven don't begin to describe Kamen. Nor do arrogant and stubborn.

He talks endlessly about wanting to change the world first and make money second. You come to believe him, at least most of the time, in large part because his remarkable medical inventions — including a wheelchair that climbs stairs — have shown exactly what he can deliver.

A parade of fawning would-be investors makes clear that Kamen could have relinquished control of Segway in exchange for millions of dollars at many junctures. He insists he couldn't do that and still realize his mission: changing the world....That's an easier decision when you're already rich, of course.

But Kamen is a remarkably committed do-gooder — witness his unceasing investment of time, money, prestige and influence into FIRST, the successful program he founded in 1989 to promote an appreciation of science and technology among young people. Nowhere was this better illustrated than in the book's description of his going to comical extremes to transform a photo op with President Clinton into an opportunity to lobby Clinton in behalf of FIRST.

But Kamen's a cheap bastard, too, and not in the stereotypical skinflint way that makes poking fun at New Hampshire great sport here in Massachusetts. Kamen loves his toys and fancy homes. He's cheap in ways that clearly endangered Segway's chances to succeed: skimping on staff and recruitment bonuses when additional engineers were desperately needed, endlessly delaying important decisions rather than committing to unavoidable costs, underpaying his stars.

No one disputes his genius, and the loyalty he inspires in his troops is unwavering. But he's also an intellectual bully who belittles most non-technical endeavors. (When he tortures a teenage clerk at a mall ice cream stand because she doesn't know the word conical, you're hoping she slaps him one.)

The jury's still out on the commercial acceptance of Segway and will be for years.

But read this book and you'll come away liking the invention a lot more, the inventor a little less.

Send reviews of the review to buzz@nww.com.

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